C 21.5: 958/3

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May 17, 1977 Volume 958 Number 3

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PATENT AND TRADEMARK OFFICE NOTICES

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,867,873, Re. S.N. 780,185, Filed Mar. 22, 1977, Cl. 93/33 H, BAG FORMING MACHINES, Arthur William Simpson, et al., Owner of Record: *Simon-VK Limited, Arrowebrook, Upton, Wirral, Merseyside, England,* Attorney or Agent: V. M. Creedon, et al., Ex. Gp.: 325

3,872,863, Re. S.N. 781,031, Filed Mar. 24, 1977, Cl. 128/213, PERITONEAL DIALYSIS APPARATUS, Norman Lasker, et al., Owner of Record: *American Medical Products Corp., Fairfield, N.J.,* Attorney or Agent: Arthur H. Seidel, et al., Ex. Gp.: 335

3,874,575, Re. S.N. 780,317, Filed Mar. 23, 1977, Cl. 224/42.03 B, BICYCLE RACK, Steven A. Wasserman, Owner of Record: *Inventor,* Attorney or Agent: Richard D. Mason, et al., Ex. Gp.: 314

3,916,170, Re. S.N. 780,644, Filed Mar. 23, 1977, Cl. 235/150.21, AIR-FUEL RATIO FEED BACK TYPE FUEL INJECTION CONTROL SYSTEM, Hideaki Norimatsu, et al., Owner of Record: *Nippondenso Co., Ltd. Kariya-Shi, Japan,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 236

3,948,460, Re. S.N. 781,688, Filed Mar. 28, 1977, Cl. 242/107.4 A, PENDULUM SUPPORT FOR A SEAT BELT RETRACTOR, Joseph D. Kondziola, Owner of Record: *General Motors Corp., Detroit, Mich.,* Attorney or Agent: Charles E. Leahy, et al., Ex. Gp.: 242

3,953,442, Re. S.N. 779,823, Filed Mar. 21, 1977, Cl. 74/665 GE, TRANSFER CASE WITH GEAR AND CHAIN DRIVE, Leo R. Kessmar, Owner of Record: *Dana Corporation, Toledo, Ohio,* Attorney or Agent: David H. Wilson, et al., Ex. Gp.: 345

3,964,283, Re. S.N. 781,024, Filed Mar. 24, 1977, Cl. 72/42, PRODUCTION OF MULTIPLE ELONGATED PRODUCTS SUCH AS WIRE, Francis Joseph Fuchs, Jr., Owner of Record: *Western Electric Company, Incorporated, New York, N.Y.,* Attorney or Agent: R. Spencer, et al., Ex. Gp.: 321

PATENT NOTICES

Certificates of Correction for the Week of May 17, 1977

Re. 29,139	3,973,961	3,996,128	4,005,958
D. 242,343	3,975,218	3,996,358	4,006,013
D. 243,082	3,976,116	3,996,381	4,006,091
D. 243,448	3,978,211	3,997,286	4,006,381
D. 243,721	3,978,893	3,997,933	4,006,625
3,554,447	3,979,411	3,999,067	4,006,703
3,558,463	3,980,452	3,999,270	4,006,894
3,682,435	3,980,760	3,999,458	4,007,431
3,698,749	3,980,839	3,999,511	4,007,480
3,704,110	3,981,175	3,999,523	4,007,818
3,712,982	3,982,184	3,999,598	4,007,843
3,728,126	3,982,703	3,999,655	4,008,095
3,747,834	3,982,791	3,999,854	4,008,279
3,811,551	3,982,862	3,999,936	4,008,287
3,834,420	3,983,179	4,000,639	4,008,293
3,838,410	3,983,499	4,000,650	4,008,294
3,840,200	3,984,172	4,000,653	4,008,525
3,870,079	3,984,411	4,000,701	4,009,016
3,897,154	3,984,692	4,000,760	4,009,019
3,902,109	3,984,775	4,001,099	4,009,029
3,902,933	3,985,758	4,001,154	4,009,497
3,911,131	3,986,045	4,001,165	4,009,654
3,912,774	3,987,149	4,001,166	4,009,820
3,920,091	3,987,283	4,001,359	4,009,821
3,929,192	3,987,343	4,001,434	4,009,911
3,929,575	3,987,678	4,001,495	4,009,987
3,929,748	3,987,803	4,001,626	4,010,044
3,939,304	3,987,964	4,001,750	4,010,212
3,944,494	3,988,069	4,001,898	4,010,288
3,946,534	3,988,091	4,002,081	4,010,418
3,950,419	3,988,949	4,002,173	4,010,522
3,950,731	3,989,856	4,002,616	4,010,588
3,955,090	3,990,025	4,003,122	4,010,986
3,957,148	3,990,284	4,003,274	4,011,154
3,959,258	3,991,545	4,003,316	4,011,319
3,959,591	3,991,860	4,003,603	4,011,433
3,961,085	3,992,144	4,003,636	4,011,508
3,962,125	3,992,348	4,003,859	4,011,625
3,962,725	3,992,441	4,003,873	4,011,833
3,965,757	3,992,685	4,004,714	4,012,047
3,966,880	3,992,690	4,004,747	4,012,510
3,968,465	3,993,604	4,004,822	4,012,724
3,968,560	3,994,939	4,004,869	4,013,422
3,970,301	3,995,027	4,005,158	4,013,473
3,972,030	3,995,120	4,005,257	4,013,660
3,972,821	3,995,253	4,005,517	
3,973,108	3,995,875	4,005,695	

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF APRIL 9, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-13-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	5-21-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	8-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-21-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-6-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-15-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-19-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-5-76

Expiration of patents: The patents within the range of numbers indicated below expire during April 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,931,038 to 2,934,765, inclusive
Plant Patents..... Numbers 1,926 to 1,948, inclusive

REISSUE PATENTS

GRANTED MAY 17, 1977

ERRATA

For CLASS	See PATENT NO.
051–163.1	29,220

REISSUES

MAY 17, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,219
SURFACTANT OIL RECOVERY PROCESS

Kenoth H. Flournoy, Levelland; Joseph T. Carlin, and Ricardo L. Cardenas, both of Houston, all of Tex., assignors to Texaco Inc., New York, N.Y.

Original No. 3,915,230, dated Oct. 28, 1975, Ser. No. 475,211, May 31, 1974. Continuation-in-part of Ser. No. 314,870, Dec. 13, 1972, abandoned. Application for reissue Mar. 12, 1976, Ser. No. 666,272

Int. Cl.² E21B *43/22*

U.S. Cl. 166—252 **25 Claims**

25. In a method for recovering petroleum through a production well from a porous, petroliferous formation by injecting through an injection well a surfactant solution of controlled hardness and salinity within determinable controllable effective concentration values of hardness and salinity for at least partial displacement of petroleum to a production well, the improvement for increasing the effectiveness of said surfactant for displacing petroleum which comprises:

injecting into said formation ahead of said surfactant solution an aqueous hydrophilic polymer-containing, preflush solution of said effective hardness and salinity values.

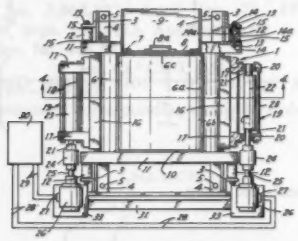
Re. 29,220
VIBRATORY FINISHING MACHINE

John F. Rampe, Mayfield Heights, Ohio, assignor to Rampe Research, Cleveland, Ohio

Original No. 3,449,869, dated June 17, 1969, Ser. No. 534,710, Mar. 16, 1966. Continuation of Ser. No. 42,908, Dec. 11, 1970, abandoned. Application for reissue Dec. 18, 1972, Ser. No. 315,787

Int. Cl.² B24B *31/06*

U.S. Cl. 51—163.1 **14 Claims**



1. A precision finishing machine characterized by orbital movement of bulk finishing media, comprising:

a. a supporting structure *including first and second spaced opposed upstanding structures;*

b. a centrally disposed receptacle *positioned longitudinally between said structures and having first and second regions positioned near said first and second structures, respectively;*

c. elastomeric spacer means resiliently [mounted] *mounting said receptacle* on the supporting structure *including a first plurality of elastomeric spacers interposed between said first region and said first structure, and a second plurality of elastomeric spacers interposed between said second region and said second structure;*

d. vibration-inducing means *including a plurality of shaft-supported eccentrics mounted* on opposite sides of the receptacle at substantially the level of the center of mass of the receptacle and its load [, such vibration-inducing means including] , *the longitudinal axes of said shaft supported eccentrics paralleling the longitudinal horizontal axis of the receptacle;*

e. power means *drivingly coupled to said vibration-inducing means;* [and, as an adjunct thereto] ;

f. an auxiliary system for positioning, adjusting the position of, and controlling the power means [.] *; and,*

g. said elastomeric spacers being arranged with their longitudinal mounting axes disposed generally parallel to the longitudinal horizontal axis of the receptacle and said vibration-inducing means being operative to impart vibrations to said tub in directions substantially transverse to the tub thereby subjecting said elastomeric spacers principally to shear forces as said regions move relative to said structures.

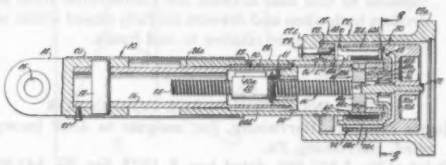
Re. 29,221
ACCELERATION SENSITIVE MOTION SNUBBER

Elmer Chensheng Yang, Orange, Calif., assignor to Pacific Scientific Company, Anaheim, Calif.

Original No. 3,876,040, dated Apr. 8, 1975, Ser. No. 402,451, Oct. 1, 1973. Application for reissue May 13, 1976, Ser. No. 685,949

Int. Cl.² F16F *7/10*

U.S. Cl. 188—1 B **36 Claims**



33. A motion snubbing device comprising:

a pair of support members mounted to reciprocate on each other while being restrained from relative rotation;

a rotatably mounted torque carrier;

means for translating relative axial movement of said support members into rotation of said carrier;

a cylindrical brake surface concentrically positioned adjacent said carrier; and

means including an inertia mass and a torsion producing spring connected to rotate with said carrier in a manner to sense the relative acceleration of said carrier and to cooperate with said brake surface to limit said acceleration to a predetermined threshold.

Re. 29,222
DISPLAY FIXTURE

Max E. Hosmer, Charlevoix, Mich., assignor to Freedman Artcraft Engineering Corporation, Charlevoix, Mich.

Original No. 3,788,717, dated Jan. 29, 1974, Ser. No. 273,716, July 21, 1972. Application for reissue Jan. 12, 1976, Ser. No. 648,202

Int. Cl.² A47B *88/00*; A47F *3/00*

U.S. Cl. 312—122 **23 Claims**

1. A display fixture comprising

a rectangular metal front frame, said frame having top and bottom members interconnected by side members,

a pair of vertically spaced slide brackets secured to each of said frame side members, each of said brackets having a pair of rollers mounted thereon, said pair of rollers of each of said brackets being located in a common horizontal plane,

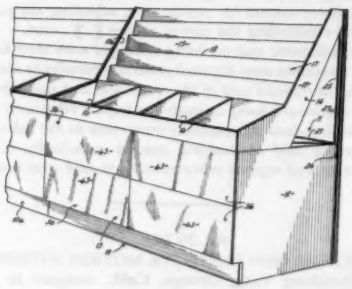
a pair of fixture side walls, said frame being secured to and

located between said side walls adjacent the front edge thereof,

a brace extending between said side walls, said brace being located rearwardly from said front frame,

display means including a display surface located between said side walls and above the top of said front frame, and

slideable drawers mounted within said front frame, said drawers each having a bottom wall, a front and rear wall,



and a pair of side walls, said side walls each having an outwardly facing channel-defining means thereon, each of said channels being received over and slideable relative to a pair of rollers on one of said brackets,

said rollers of each of said brackets being horizontally spaced so that said drawers are cantilevered from said rollers both when said drawers are fully closed within said frame or fully open relative to said frame.

Re. 29,223

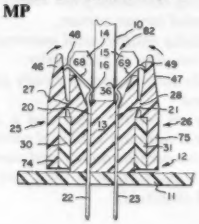
ZERO INSERTION FORCE CONNECTOR

James Prituisky, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Original No. 3,897,991, dated Aug. 5, 1975, Ser. No. 442,955, Feb. 15, 1974. Application for reissue Mar. 15, 1976, Ser. No. 666,718

Int. Cl.² H01R 13/62

U.S. Cl. 339—75 MP **24 Claims**



14. A zero entry force connector for connecting to a plurality of external terminals positioned on the edge of a supporting member comprising:

a housing having an elongated base portion;

a plurality of contacts each having a first portion having a supporting member engaging portion, and a housing engaging portion connected to said first portion and arranged in first and second parallel rows to form a single row of pairs of said contacts with the housing engaging portions of each pair being mounted in said base portion and with their first portions extending out of said housing base and having their supporting member engaging portions facing each other;

said housing comprising first and second strip means pivotally connected to said elongated base portion and bearing against said first portion of said contacts;

said first and second strip means attached to said housing base portion on opposite sides thereof and parallel to said first and second rows of contacts, and having formed on facing surfaces thereof first and second rods of ramps of similar first slope and separated by first shoulders; and

actuator means comprising third strip means supported by said first and second strip means and said housing base portion and having third and fourth rows of ramps of slope similar to said first slope and separated by second shoulders, formed on surfaces thereof which face away from each other;

said actuator means being positioned between said first and second rows of ramps with said third and fourth rows of ramps mating with said first and second rows of ramps, respectively;

said actuator means further constructed to move longitudinally with respect to said rows of ramps to cause the ramps of said mated rows of ramps to ride up and down each other to pivot said first and second strip means about their pivotal connections to said housing base portion to increase or decrease the distance between the contacts of each pair of contacts.

Re. 29,224

POLYURETHANE UREA ELASTOMERS BASED ON POLYCARBONATE MACRODIOLS

Josef Pedain; Klaus Noll, both of Cologne; Klaus Konig, Leverkusen, and Wilhelm Thoma, Bergisch-Neukirchen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

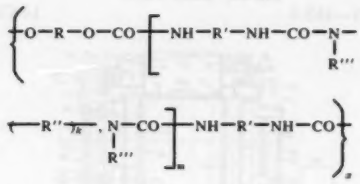
Original No. 3,867,350, dated Feb. 18, 1975, Ser. No. 353,036, Apr. 20, 1973. Application for reissue June 30, 1976, Ser. No. 701,393

Claims priority, application Germany, May 4, 1972, 2221751

Int. Cl.² C08G 22/10, 18/75

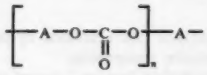
U.S. Cl. 260—77.5 AM **2 Claims**

1. Polyurethane urea elastomers corresponding to the formula:



in which

R represents the group



where 40 to 100 percent by weight of A represents

$$-(CH_2-CH_2-O)_p-CH_2-CH_2-$$

and 0 to 60 percent by weight of A represents $-(CH_2)_q-$

where

p = 2 – 7,

q = 6 or 7,

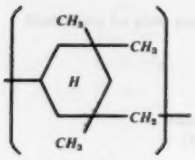
n = 2 – 40,

R′ represents a divalent C_6–C_{14} aromatic, C_4–C_{18} aliphatic or C_5–C_{20}-cycloaliphatic radical,

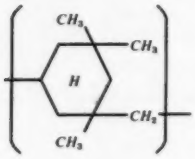
R″ represents a divalent C_6–C_{14} aromatic, C_4–C_{18} aliphatic or C_5–C_{20}-cycloaliphatic radical, which may contain nitrogen as heteroatom, or a $-NH-CO-(NH)_r-R'''-(NH)_r-CO-NH-$ group

where

R^{IV} is a C_1–C_{10} aliphatic or C_5–C_{20} cycloaliphatic radical,
r = 0 or 1;
s = 0 or 1,
R''' represents H or a C_1–C_6 aliphatic radical,
and
k = 0 or 1,
m = 0 – 4,
x = 5 – 200
at least 20 mol % of R' or R'' being [cycloaliphatic]



radicals or at least 20 mol % of both R' and R'' being [cycloaliphatic]



radicals.

Re. 29,225

N-SUBSTITUTED DERIVATIVES OF 3-CARBOXAMIDE AND 3-THIOCARBOXAMIDE

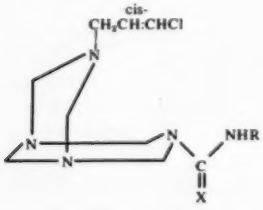
Albertha M. Paul nee Albertha B. Mitchell, Holliston, Mass., and Charles E. Moppett, Mystic, Conn., assignors to The Dow Chemical Company, Midland, Mich.

Original No. 3,862,187, dated Jan. 21, 1975, Ser. No. 397,180, Sept. 13, 1973. Application for reissue Jan. 15, 1976, Ser. No. 649,173

Int. Cl.² C07D *251/72*

U.S. Cl. 260—248 NS **19 Claims**

1. A compound corresponding to the formula



wherein X represents O or S and R represents lower alkyl, 5 to 8 carbon atom cycloalkyl, phenyl or substituted-phenyl having lower alkyl, lower alkoxy, halo or sulfonyl substitution.

Re. 29,226

PREPARATION OF CARBOXYLATE AND SULFONATE SALTS OF 1-CIS-(3-CHLORO-2-PROPENYL)-3,5,7-TRIAZA-1-AZONIATRICYCLO(3.3.1.1^{3,7})DECANE-II

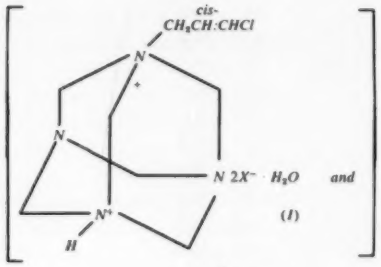
Albertha M. Paul nee Albertha B. Mitchell, Holliston, Mass.; Charles E. Moppett, Mystic, Conn., and Thomas P. Brady, Natick, Mass., assignors to The Dow Chemical Company, Midland, Mich.

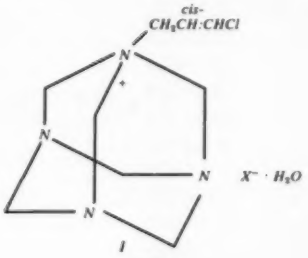
Original No. 3,862,940, dated Jan. 28, 1975, Ser. No. 409,340, Oct. 24, 1973. Application for reissue Jan. 26, 1976, Ser. No. 652,608

Int. Cl.² C07D *251/72*

U.S. Cl. 260—248.5 **14 Claims**

1. A compound corresponding to [one of] the [formulas] *formula*





[(II)]

wherein X represents a lower alkyl carboxylate, [(I)] a lower alkyl sulfonate, [(II)] a benzoate [(I)] or a phenylsulfonate [(II)] salt wherein the phenyl group may contain lower alkyl, lower alkoxy, hydroxyl, amino, nitro, chloro or bromo substitution.

R³ is a C₁-C₄ alkylene, or C₂-C₄ carbalkylene radical, [illegible]

x = 0 or 1,

R'' represents H or C₁-C₄ [illegible]

[illegible]

wherein X represents O or S and R represents lower alkyl, 5 to 8 carbon atom cycloalkyl, phenyl or substituted phenyl having lower alkyl, lower alkoxy, halo or carboxy substituents.

PREPARATION OF CARBOXYLATE AND SULFONATE SALTS OF [illegible]

[illegible]

SUBSTITUTED DERIVATIVES OF [illegible] AND [illegible]

[illegible] Original No. [illegible], dated Jan. [illegible], 1975, [illegible] Application for reissue [illegible]

Int. Cl.² [illegible]

U.S. Cl. [illegible] Claims

1. A compound corresponding to the formula

[illegible]

PLANT PATENTS

GRANTED MAY 17, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,055
REDKIST
Alton C. Wendzel, Watervliet, Mich., assignor to Hilltop Orchards & Nurseries, Inc., Hartford, Mich.
Filed Jan. 7, 1976, Ser. No. 647,004
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—43 **1 Claim**

1. A new and distinct variety of peach tree substantially as shown and described.

PATENTS

GRANTED MAY 17, 1977

ERRATA

For CLASS	See PATENT NO.
010–096 T	4,023,211
004–177 CW	4,023,220
428–650	4,023,252
428–566	4,023,253
076–036	4,023,445
076–040	4,023,446
090–013.05	4,023,464
100–215	4,023,484
138–149	4,023,589
181–033 R	4,023,642
266–222	4,023,676
417–570	4,023,916
418–191	4,023,617
428–679	4,023,936
065–112	4,023,945
062–180	4,023,947
062–191	4,023,948
062–309	4,023,949
260–590 D	4,024,067
260–250 C	4,024,082
424–180	4,024,222
424–180	4,024,223
424–180	4,024,224
260–243 C	4,024,249
358–297	4,024,340
358–206	4,024,341
358–148	4,024,343
174–110 A	4,024,355
361–045	4,024,435
361–045	4,024,436
361–087	4,024,437
361–092	4,024,438
361–076	4,024,439
361–251	4,024,440
361–334	4,024,441
361–322	4,024,442
324–003	4,024,468
324–016 R	4,024,469
324–037	4,024,470
324–123 R	4,024,471
324–151 R	4,024,472
324–168	4,024,473
325–037	4,024,474
325–055	4,024,475
325–421	4,024,476
325–455	4,024,477

PATENTS

GRANTED MAY 17, 1977

ERRATA

PATENTS

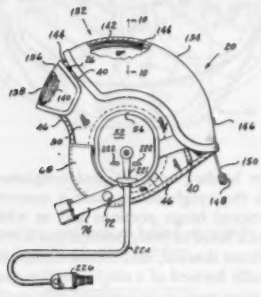
GRANTED MAY 17, 1977

GENERAL AND MECHANICAL

4,023,209
PROTECTIVE HELMET ASSEMBLY WITH SEGMENTAL OUTER SHELL

Leonard P. Frieder, Jr., Dalton, and Jackson A. Aileo, Carbondale, both of Pa., assignors to Gentex Corporation, Carbondale, Pa.

Filed Dec. 17, 1975, Ser. No. 641,450
Int. Cl.² A42B *3/00*
U.S. Cl. 2—6 **13 Claims**

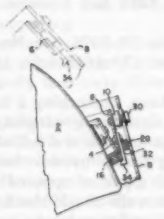


1. A protective helmet assembly including in combination, a flexible inner helmet adapted to fit relatively closely over the head of a wearer, respective discrete front and rear rigid outer shell members, said front member adapted to cover the forehead region of the wearer's head, said rear member adapted to cover the wearer's head from the forehead region rearwardly over the crown and toward the nape of the wearer's neck, means for securing said rear member to said inner helmet over the portion thereof corresponding to the head region adapted to be covered by said rear member, and means for manually detachably securing said front shell member to the forehead portion of the inner helmet.

4,023,210
UNIVERSAL FLIP-UP ATTACHMENT FOR HELMETS

Gary L. Hanson, P.O. Box 3302, Bellevue, Wash. 98009

Filed May 21, 1975, Ser. No. 579,483
Int. Cl.² A41D *13/00*
U.S. Cl. 2—10 **8 Claims**



8. An attachment for use with protective head gear enabling the wearer to quickly and easily replace commercially available face shields or remove from the line of sight the face protective portion thereof, said attachment comprising:

a. first attachment means including movable fasteners for securing the first attachment means to a helmet and further including means forming a seal between the helmet and the first attachment means,

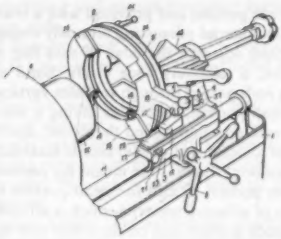
b. second attachment means pivotally secured to the first attachment means, including means permitting securement of a face shield thereto and means of sealing by engaging the first attachment means when the two attachment means are in an overlying condition, and

c. means to latch and secure the second attachment means to the first attachment means when the two attachment means are in an overlying condition.

4,023,211
APPARATUS FOR AUTOMATICALLY FORMING THREADED PORTION HAVING PREDETERMINED TAPER AND LENGTH FOR USE IN AUTOMATIC THREADING MACHINE

Fumiko Miyagawa, Higashiosaka, Japan, assignor to Rex Industrial Co., Ltd., Japan

Filed Nov. 4, 1975, Ser. No. 628,736
Claims priority, application Japan, Nov. 29, 1974, 49-137487
Int. Cl.² B23G *1/02, 5/12*
U.S. Cl. 10—96 T **3 Claims**



1. An apparatus for automatically forming a threaded portion having a predetermined taper and length for use in an automatic threading machine having a frame, said apparatus comprising:

a pair of longitudinal support rods mounted parallel to said frame of said threading machine;

die head means for forming said threaded portion;

carriage means movably mounted on said support rods for supporting said die head means thereon, said carriage means having a longitudinal cavity therethrough parallel to and surrounding one of said support rods; and

profile means for controlling the length and taper of the threaded portion formed by said die head means, said profile means having a slanted profile surface and fitted in said longitudinal cavity of said carriage means and movably mounted on said support rod in said longitudinal cavity, said profile means further extending above the surface of said carriage means, and removably contacting said die head means at said slanted profile surface.

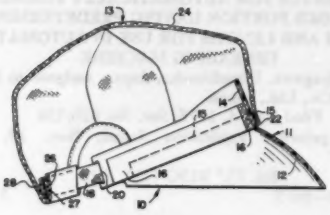
4,023,212
ADJUSTABLE VISORED CAP WITH INTERCHANGEABLE CROWN

Erline L. Huffman, 260 Estero Lane P0621, Litchfield Park, Ariz. 85340

Continuation-in-part of Ser. No. 498,652, Aug. 19, 1974, which is a continuation-in-part of Ser. No. 309,184, Nov. 24, 1972, abandoned. This application Sept. 10, 1975, Ser. No. 611,879
Int. Cl.² A42B *1/20*
U.S. Cl. 2—197 **12 Claims**

1. An adjustable visored cap comprising an eye shade portion and a crown portion, said eye shade portion comprising a

crescent-shaped slightly convex visor portion, a substantially broad forehead portion integral with said visor portion and extending beyond the temples of a wearer, said integral visor and forehead portions being integrally made of a single piece of molded, substantially rigid impact resistant material and being joined by an integral radiused portion, at least one substantially vertically disposed slit formed proximate each end of said forehead portion, an elongated flat pad of absorbent and resilient material affixed to the interior of said forehead portion for engagement with the forehead of the wearer, said flat pad being relatively wide and extending on the interior of said forehead portion with the ends of said pad extending proximate said slits, a crown portion removably attached



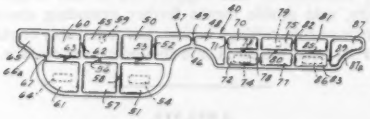
to said eye shade portion and provided with a rear flap having a pad of textile material possessing mutually engaging characteristics attached adjacent the edge of said flap on the inner surface thereof, a relatively wide elastic band adjustable in length having ends passed through said slits vertically disposed on said forehead portion, said band having a rear portion for engagement with said flap folded thereover, and means comprising at least another pad of said textile material for holding said flap in position, wherein the means for removably attaching said crown portion to said forehead portion comprises at least one strip of adhesive material which is affixed on one side to said eye shade portion and on the other side to said crown portion.

4,023,213

SHOCK-ABSORBING SYSTEM FOR PROTECTIVE EQUIPMENT

William Rovani, Chicago, Ill., assignor to Pepsico, Inc., Purchase, N.Y.

Filed May 17, 1976, Ser. No. 686,725
Int. Cl.² A42B 3/02
U.S. Cl. 2—413 7 Claims



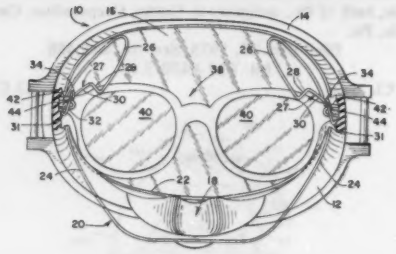
1. A protective shock-absorbing helmet comprising an impact resistant shell having a crown thereon, a plurality of webs secured to the inside of said crown and including a pair of webs arranged to engage the sides of the wearer's head, and a plurality of flexible foam-containing compartments secured to said webs, said compartments being interconnected by means of orifices each having a cross-sectional area of from 0.0005 to 0.0012 square inches (0.0032 to 0.0077 square centimeters), said pair of webs which engages the sides of the wearer's head having compartments all of which are connected to adjacent compartments by no more than two orifices.

4,023,214

MEANS FOR HOLDING EYEGLASSES WITHIN A SCUBA MASK

Arthur Waldherr, 3709 N. Bosworth, Chicago, Ill. 60613

Filed May 17, 1976, Ser. No. 687,004
Int. Cl.² G02C 3/02
U.S. Cl. 2—444 6 Claims



1. Means for holding conventional eyeglasses in a scuba mask in which the eyeglasses include a conventional frame having conventional hinge portions and in which the scuba mask comprises a hood or body portion and a transparent wall surface at the front thereof, said means comprising a member which is integrally formed of a single continuous element and which has a bottom portion and spaced side portions with said spaced side portions each terminating in a hooking end, said member when inserted in the scuba mask positioned so that the bottom portion is adjacent the bottom of the hood and the opposite sides of said member positioned adjacent the sides of the mask all adjacent the front transparent wall surface, with the upper portions of the sides of said member turned rearwardly and downwardly inside said mask and with the hooking ends hooking around the hinge portions of the frame of the eyeglasses to hold the frame in spaced relation to the front transparent wall surface of the scuba mask, so that when the scuba mask is applied to a person's face, the nose piece of the frame of the glasses will rest on the person's nose so that the person may view through said lenses and through the transparent front wall surface of the mask.

4,023,215

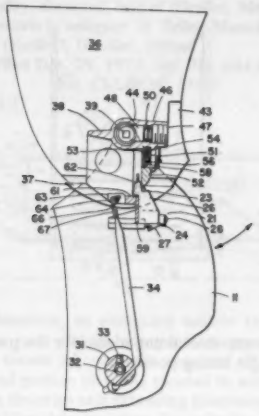
LOCKING PROSTHETIC KNEE

Robert R. Moore, 5401 San Leandro St., Oakland, Calif. 94601

Filed Feb. 17, 1976, Ser. No. 658,628
Int. Cl.² A61F 1/04, 1/08
U.S. Cl. 3—26 2 Claims

1. A knee prosthesis, comprising a knee member formed substantially of a rigid foam material, a knee mechanism secured in said knee member and including a lateral passage therethrough, a leg shank member formed substantially of rigid foam material, a pair of opposed reinforcing members anchored in the side walls of said shank member and extending from the top thereof to at least a medial portion thereof, the upper ends of said reinforcing members including aligned holes therethrough, a pivot member extending through said aligned holes and through said passage in said knee mechanism, a lock base plate extending laterally between the upper end portions of said reinforcing members, a detent member extending upwardly from said lock base plate, a latch assembly disposed in said knee mechanism; said latch assembly including a slot, a latch member disposed in said slot and translatable toward and resiliently biased toward engagement with said detent member, said knee mechanism including a friction shoe assembly adjacent to and communicating with said passage, a spool disposed within a medial portion of said

shank member and secured between said reinforcing members, and elastic member extending between said spool and

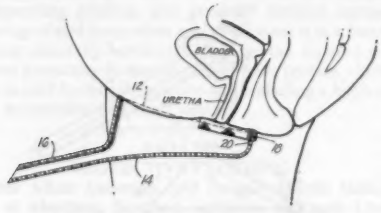


said knee mechanism, said spool being angularly adjustable to vary the tension in said elastic member.

4,023,216
URINAL DEVICE

Laurie Rhea Li, Downey, Calif., assignor to Victor F. C. Li, Downey, Calif.

Continuation-in-part of Ser. No. 527,887, Nov. 27, 1974, abandoned. This application Apr. 30, 1975, Ser. No. 573,249
Int. Cl.² E03D *13/00*
U.S. Cl. 4—110 **8 Claims**



1. A gravity-operated urinary device for use by a woman in a standing position, comprising:

means for forming an unconstrained stream of urine, and for projecting said unconstrained urine-stream through open space forwardly and away from the body of the standing woman;

said forming means comprising non-storing funneling means for gathering urine from said standing woman, and for funneling said gathered urine to a discharge conduit;

said forming means further comprising means for discharging the urine from said funneling means through open space in the form of an unconstrained urine-stream;

said funneling means comprising a funnel-like, non-storing, hollow, elongated, generally-horizontal trough defined by upright walls and open at the top, the upper edges of the walls being free, and adapted for touching-contact with the external portion of the standing woman's vulva, the opening formed by the free tops of the walls being substantially horizontal during use;

said discharging means comprising a substantially rigid discharge conduit connected to the trough at its forward end, said discharge conduit being proportioned for discharging the gathered urine as a urine-stream in the manner of a male-produced urine-stream, and for projecting the urine-stream a near-maximum distance from the standing woman.

4,023,217
SWIMMING POOL CONSTRUCTION

Frank Lee Kessler, 17 Vassar Road, Broomall, Pa. 19008

Filed Nov. 25, 1974, Ser. No. 526,935
Int. Cl.² E04H *3/16, 3/18;* F16L *22/02*
U.S. Cl. 4—172.19 **5 Claims**

1. A rectangular swimming pool comprised of side and end top and bottom rails with laterally spaced uprights extending between the top and bottom rails and including corner uprights,

rigid pool-enclosing wall means extending between the top and bottom rails,

said corner uprights each comprising a post substantially L-shaped in cross section with the included angle facing inwardly,

bolts securing the outer surface of said wall means to the inner sides of the post,

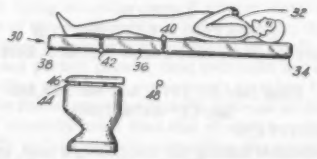
and a vertically extending rigid wall section having an inwardly facing concave surface lying athwart the included angle provided by each post and secured to the inner corner thereof,

the wall section having side extensions which overlie the bolts and an upright channeled bar coextensive with the post with the outer surface of its bottom wall secured to the outer corner of the post.

4,023,218
INVALID BED ARRANGEMENT

Paul L. Di Matteo, Huntington, N.Y., assignor to Dynell Electronics Corporation, Melville, N.Y.

Continuation-in-part of Ser. No. 544,710, Jan. 28, 1975. This application Nov. 3, 1975, Ser. No. 628,131
Int. Cl.² A61G *7/08*
U.S. Cl. 5—81 R **11 Claims**



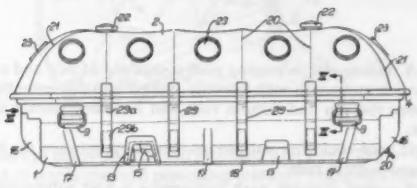
1. An apparatus for transferring a person from a reclined position to an upright seated position comprising a bed member subdivided into first, second and third sections for supporting a person with posterior at a first location; means for moving the thighs of the person in a direction toward the front side of the other parts of the person's body; means for bending said person's knees; means for removing said first bed member section from contact with the posterior of said person for freeing the area substantially at the posterior of said person; means for placing a seating member in contact with the posterior of said person; and means for moving said person together

with said seating member to an upright seated position with lower parts of the legs directed downward; at least part of the weight of said person being directed away from said posterior while placing said seating member in contact with the posterior of said person.

4,023,219
NUCLEAR ACCIDENT CARRIER

Harry Shindler, Hartford, Conn., assignor to Infranor S.A., Switzerland

Filed Sept. 24, 1973, Ser. No. 399,715
Claims priority, application Switzerland, Sept. 29, 1972, 14284/72
Int. Cl.² A61G *1/02*; A47B *96/00*
U.S. Cl. 5—82 R **8 Claims**



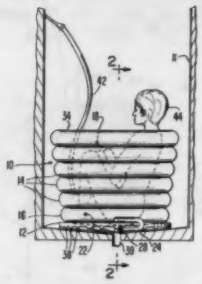
1. A carrier for transporting an injured contaminated person comprising, a base made as a one-piece lightweight plastic elongated shell open upwardly for receiving a person on a stretcher therein, a lid for hermetically enclosing said person on a litter in said base, said lid comprising a one-piece lightweight plastic elongated shell open downwardly, said base having a peripheral rim extending upwardly and outwardly defining a slightly enlarged peripheral upper marginal portion, said upper marginal portion defining an inner shoulder against which a lower peripheral edge of said lid abuts, said lid having a continuous sealing strip secured outwardly of a peripheral lower marginal portion for abutting against the interior of said upper marginal portion for effecting a hermetic seal therewith when the lid is closed, hinge means for hinging said lid on said base along a longitudinal marginal edge thereof, said lid having a plurality of closable apertures spaced longitudinally thereon each disposed to receive a glove-like sleeve for access into the interior of said lid and said base without opening the lid, and removable covers each removably closing a corresponding one of said apertures.

4,023,220
INFLATABLE BATHING TUB

Susan Myers Younker, 3033 Deakin St., No. 3, Berkeley, Calif. 94705

Filed July 23, 1975, Ser. No. 598,546
Int. Cl.² A47K *3/06*
U.S. Cl. 4—177 CW **6 Claims**

1. An inflatable bathing tub comprising a base, an enclosing side wall portion connected to and extending upwardly from said base to define a water-tight bathing tub, said side wall portion being formed of an airtight, flexible material and comprising an airtight chamber spaced such that said side wall portion will be self-supporting when said chamber is inflated, air valve means in said side wall portion for enabling said chamber to be inflated and deflated, valve means in said bottom portion for enabling said tub to be drained of water, said base of said tub having a ridged bottom surface to hold said tub at an elevated level, above a supporting surface, thereby allowing water to drain thereunder into the drain of a shower stall, said tub being approximately 2½ to 3 feet in diameter and about 2 to 3 feet high so as to be large enough to be placed within a single-person shower stall, whereby a person may place said tub within a shower stall and employ

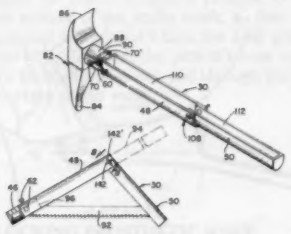


said tub as a water-containing means for the purpose of bathing in an upright sitting position.

4,023,221
MULTIPURPOSE TOOL KIT AND FOLDING HANDLE THEREFOR

Russell O. Cadman, Rte. 2, Box G-90, Garfield, Ark. 72732

Filed Sept. 11, 1975, Ser. No. 612,499
Int. Cl.² B25F *1/02*; A45C *11/26*
U.S. Cl. 7—1 R **8 Claims**



1. In a lightweight portable tool kit having container means and a plurality of tool implements designed to accomplish at least one tool function, an improved handle adapted to be threadably attached to at least one of the plurality of tool implements and adapted to support end portions of a different one of the tool implements, the improved handle comprising:

a first handle portion with a threaded end operable to be threadably connected with the at least one of the plurality of tool implements;

a second handle portion shorter than the first handle portion and having a first end;

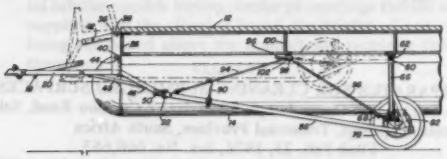
position detent means providing a pivotal connection between the first handle portion and the second handle portion and operable to fix the relative position of the second handle portion with respect to the first handle portion at a folded position, an extended position and a position intermediate the folded and extended positions; and

attachment means at the threaded end of the first handle portion and the first end of the second handle portion operable to support end portions of the different one of the tool implements when the first handle portion and the second handle portion are in the intermediate position.

4,023,222
PONTOON BOAT WITH RETRACTABLE RUNNING GEAR

Robert M. Selby, deceased, late of Nicollet, Minn. (by Irma I. Selby, executrix), assignor to Selby Manufacturing Company, Inc. (Entire), Nicollet, Minn.

Filed Dec. 29, 1975, Ser. No. 644,898
Int. Cl.² B63C *13/00*
U.S. Cl. 9—1.2 **9 Claims**

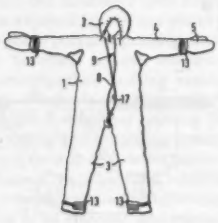


1. In combination, an elongated mobile structure having front and rear ends and including a body portion, elongated support arm means adjacent the rear end of said structure having one end portion pivotally secured to said body portion for oscillation about an axis extending transversely of said arm means and said mobile structure for swinging between a depending position and a generally horizontal position with other end portion of said arm means swung toward the front end of said structure, said other end of said arm means having ground engaging support wheel means journaled therefrom, an elongated lever pivotally secured intermediate its opposite ends, to said front end of said structure for oscillation about an axis generally paralleling the first mentioned axis between a position extending generally longitudinally of said structure and an upstanding position, and elongated link means extending longitudinally of said structure and pivotally secured at its rear end to said other end portion of said arm means and at its forward end to the rear end of said lever, said link means interconnecting said lever and said arm means for generally horizontal positioning of said lever when said arm means is in said depending position and generally vertical upstanding positioning of said lever when said arm means is in a forwardly projecting generally horizontal position, the forward end of said lever projecting forwardly of said body portion when said lever is in said horizontal position and including a hitch member for securement to a draft vehicle.

4,023,223
PROTECTIVE CLOTHING

Alexander Adam Anderson, and Douglas Martin Gallacher, both of Aberdeen, Scotland, assignors to Cosalt Limited, Grimsby, England

Filed Mar. 29, 1976, Ser. No. 671,050
Claims priority, application United Kingdom, Apr. 2, 1975, 13457/75
Int. Cl.² B63C *9/08*
U.S. Cl. 9—330 **8 Claims**



1. An emergency overall suit comprising a single garment having a trunk portion, with an access opening closed by a watertight fastening, a hood, legs and arms, the suit being of textile material in two layers, respectively an inner heat-insulating layer and an outer waterproof layer, the suit also comprising the following features in combination:

a. the inner layer and outer layer are intersecured, by seams at the ankles, wrists, neck and access opening, but their opposed inside surfaces are otherwise separable to provide between them an air space;

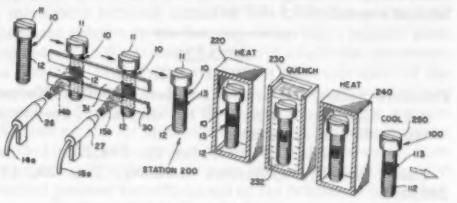
b. at each ankle and wrist and at the neck there is an inner encircling sealing band and means to hold the sealing band comfortably tight around the body of the wearer; and

c. at each extremity of the legs and arms of the suit, small vents are provided to allow for admission of air and water to the space between the inner and outer layers of the suit.

4,023,224
METHOD FOR PRODUCING SELF-LOCKING FASTENERS

Robert A. Frailly, Massillon, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 458,370, April 5, 1974, abandoned. This application Aug. 28, 1975, Ser. No. 608,804
Int. Cl.² B23G *9/00*
U.S. Cl. 10—10 P **8 Claims**



1. A method for producing reusable, metallic, self-locking fasteners having an axially extending threaded portion for engagement with a complementary threaded member and a metallic patch bonded to the threaded portion for self-locking interference with the complementary threaded member, said patch being spongy and porous and thicker in the thread valleys than on the adjacent thread crests, the outer surface of said patch being smoother and of greater density than the remainder of the patch, said method comprising the steps of:

A. providing a metallic fastener having an axially extending threaded portion prior to heat treatment thereof;

B. providing at least one continuously spraying, flame spray gun for flame spraying a metallic material having a modulus of elasticity lower than that of said threaded portion;

C. axially and rotationally controlling the position of said metallic fasteners while simultaneously moving each of said fasteners sequentially into the spray of said first flame spray gun to produce a spongy, porous deposit of said threaded portions having an effective circumferential extension of less than 360° of the circumference of the fastener, said deposit being substantially thicker in the thread valleys than on the adjacent crests;

D. heating the fastener and the patch after the spraying step of (C);

E. placing the heated fastener and patch into a quenching medium;

F. reheating the fastener and patch; and

G. allowing the fastener and patch to cool.

4,023,225

METHOD OF FABRICATION OF HEADED-SHANK PARTS FROM HIGH-STRENGTH TWO-PHASE TITANIUM ALLOYS

Anatoly Andreevich Tochilkin, Okruzhnoi proezd, 24, kv. 14; Vladilen Filippovich Pshirkov, ulitsa Svobody, 28, korpus 2, kv. 61; Semen Abramovich Vigdorchik, ulitsa K.Marxa, 20, kv. 291, all of Moscow; Igor Andreevich Vorobiev, ulitsa Kavalikhinskaya, 77, kv. 59; Viktor Grigorievich Petrikov, ulitsa Dzerzhinskogo, 24 "g", kv. 12, both of Gorky Nizhegorodsky raion, and Alexandr Andreevich Kastosov, ulitsa Pravdy, 5a, kv. 3, Gorky, Leninsky raion, all of U.S.S.R.

Filed Oct. 24, 1975, Ser. No. 625,840

Claims priority, application U.S.S.R., Nov. 1, 1974, 2072060

Int. Cl.² B21K *1/46, 1/58*

U.S. Cl. 10—27 R 7 Claims

1. A method of fabricating headed-shank parts from billets made of high-strength two-phase titanium alloys, consisting of the steps of: applying a protective coating to said billet; forming a shank on a portion of said billet by cold reduction; heading the remaining portion of the billet with subsequent simultaneous rolling of the shank and of a radius under the head; and performing said shank forming and heading operations at a speed of 0.5–1.0 m/s.

4,023,226

TRANSPORT VEHICLE

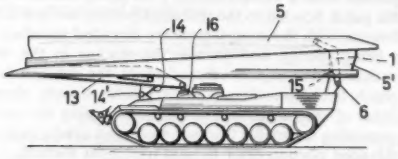
Friedhelm Soffge, and Archim Schubecker, both of Kornwestheim, Germany, assignors to Dr. -Ing. h.c.F. Porsche Aktiengesellschaft, Germany

Filed Jan. 27, 1975, Ser. No. 544,271

Claims priority, application Germany, Jan. 25, 1974, 2403494

Int. Cl.² E01D *15/12*

U.S. Cl. 14—2.4 21 Claims



17. A vehicle for transporting and installing a sectionalized bridge, the vehicle comprising:

at least two bridge sections disposed on the vehicle in an overlying relationship

a first bridge section placer means mounted on the vehicle for selectively displacing a first of said at least two bridge sections in at least one direction;

means interposed between said first placer means and the first bridge section for operatively connecting said first placer means with the first bridge section;

a second bridge section placer means mounted on the vehicle for selectively displacing the second of the at least two bridge sections in at least one direction opposite to the direction of displacement of said first placer means; and

means provided on said second placer means for accommodating second bridge sections of varying lengths including a connecting arm assembly mounted between said second placer means and said second bridge section, said connecting arm assembly including a first pair of spaced support members extending in the longitudinal direction of the vehicle, one end of each of said support members being pivotally connected to said second placer means, and at least a second pair of spaced support members extending in the longitudinal direction of the vehicle telescopically mounted on said first pair of support members.

4,023,227

APPARATUS FOR CLEANING SUBMERGED SURFACES

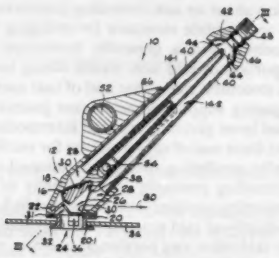
Fernand Louis Oscar Joseph Chauvier, 7 Caribou Road, Selcourt, Springs, Transvaal Province, South Africa

Filed Feb. 23, 1976, Ser. No. 660,663

Claims priority, application South Africa, Feb. 25, 1975, 75/1166; Mar. 24, 1975, 75/1848

Int. Cl.² E04H *3/20*

U.S. Cl. 15—1.7 22 Claims



1. A cleaning apparatus for automatically cleaning asurface submerged in a liquid, the apparatus including a cleaning head having a peripheral region releasably engageable with the surface to be cleaned; two suction passages in suction communication with the head through communication openings therein; valve seats located at each of the communication openings; and a valve member that is automatically displaceable between and against the valve seats for automatically transferring liquid flow through the passages from the head alternately and repeatedly from one of the passages to the other.

4,023,228

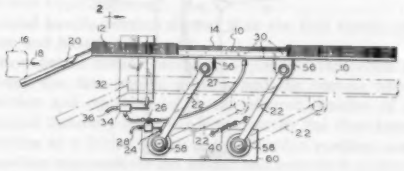
WHEEL CLEANER

Daniel C. Hanna, 1133 SW. Rivington Drive, Portland, Oreg. 97201

Filed June 18, 1975, Ser. No. 588,013

Int. Cl.² B60S *3/04*

U.S. Cl. 15—53 B 4 Claims



1. In a wheel cleaner,

a plurality of flexible applicators comprising flexible bristles sufficiently stiff that only the ends of the bristles engage a sidewall of a tire when pressed endwise against the sidewall,

non-rotating means mounting the bristles in substantially horizontal parallel, vertically spaced rows,

means urging the holding means toward the sidewall of the tire to press the ends of the bristles into engagement with the sidewall and extending across chords of the sidewall,

and means for flowing a cleaning liquid along the bristles to the ends thereof so that the bristles wipe the sidewall and spread the cleaning liquid thereover as the tire is rotated,

the holding means and flowing means comprising a horizontal tubular conduit having discharge openings therein and supplied with the cleaning liquid, the bristles of one row being positioned above the conduit and receiving liquid therefrom.

4,023,229

PRINTING PLATE WASHING APPARATUS

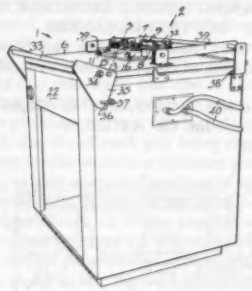
Langdon R. Blight, Kent Town, Australia, assignor to Alison M. Blight, Kent Town, Australia

Filed Mar. 29, 1976, Ser. No. 671,160

Claims priority, application Australia, Apr. 3, 1975, 1100/69

Int. Cl.² A46B *15/00*

U.S. Cl. 15—77 **12 Claims**



1. An apparatus for the washing out of an unpolymerised portion of a photo polymer printing plate, the apparatus being of a type including a container for holding of selective washing out solvent, photo polymer printing plate holding means to hold the printing plate with at least the exposed face of the printing plate within solvent contained within the container, brush means within the container with bristles positioned to engage against the exposed face of any photo polymer printing plate held by the photo polymer printing plate holding means, and drive means to effect relative movement between the photo polymer printing plate holding means and the brush means whereby to effect a scrubbing action against the exposed face of any photo polymer printing plate held by the photo polymer printing plate holding means, the invention being characterized in that the drive means include a fluid operated motor means, by which the relative movement between the photo polymer printing plate holding means and the brush means is able to be effected, and mechanically operable change over means arranged to periodically stop the said relative movement proceeding in one direction of a predetermined path and cause this to recommence in a contra direction, and this arranged so as to cause the bristles of the brush means to at least move momentarily against their formerly laid over direction.

4,023,230

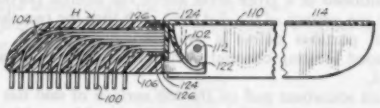
RETRACTABLE BRISTLE BRUSH

Jack S. Friedman, Highland Park, and William J. Kenney, Villa Park, both of Ill., assignors to Jack S. Friedman, Highland Park, Ill.

Filed Sept. 4, 1975, Ser. No. 610,450

Int. Cl.² A46B *9/10*

U.S. Cl. 15—185 **2 Claims**



1. A retractable bristle brush comprising a housing having a bottom side, a top side, spaced side walls and spaced end walls, a plurality of openings extending inwardly from the bottom side, a plurality of bristles aligned with said openings, means mounted for movement between retracted and extended positions of adjustment relative to the housing, the inner ends of said bristles being connected to said means for movement of said bristles through said openings to retracted position within the housing responsive to movement of said means to retracted position and for movement to extend substantially perpendicularly outwardly from the bottom side of the housing responsive to movement of said means to extended position in which the interior of the housing is formed with a plurality of laterally and longitudinally spaced apart channels which terminate as openings through the bottom side of the housing to extend substantially perpendicularly thereof, said channels extending curvilinearly through said housing and to terminate at their inner ends facing in a direction perpendicular to their outer end, in which the means mounted for movement between retracted and extended positions of adjustment relative to the housing comprises a support plate mounted within the housing for relative lengthwise movement in a direction toward and away from the inner ends of the channels, said bristles being slidably received within said channels and connected at their inner ends to the support plate, and means for actuation of said support plate between extended position for projection of the bristles outwardly from said opening beyond the bottom side of the housing, and retracted position for withdrawal of the bristles to bring their inner ends within the housing.

4,023,231

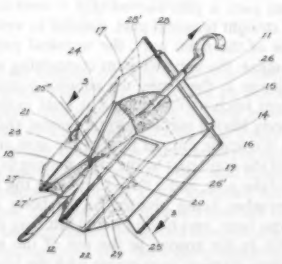
OIL DIP STICK WIPER

Terry M. Haber, 3050 S. Bristol, No. 8C, Santa Ana, Calif. 92707

Filed July 26, 1976, Ser. No. 708,341

Int. Cl.² F01M *11/12*; G01F *15/12, 23/04*

U.S. Cl. 15—210 B **2 Claims**



1. An oil dip stick wiper comprising, in combination:

a. a flat rectangular base having means on its bottom surface for securing it in an inclined position to a selected struc-

tural portion of a vehicle adjacent to the internal combustion engine oil dip stick;

b. a partially open-ended housing defined by opposite walls extending upwardly from the top surface of said flat base adjacent to opposite side edges, said walls thence turning inwardly towards each other and thence sloping downwardly and inwardly to to terminate in on integral transversely oriented, flexible slotted vane, the slot opening at the top of the vane and in which the bottom of said slot is positioned at a given level above the central portion of the top surface of the flat base such that the two sloping wall portions define a symmetrically oriented, "V"-shaped locating channel along the top of said housing; and,

c. a slit absorbent pad on the top surface of said flat base surrounding the vane, held contained and located by both the walls defining said housing, and by the transversely oriented, flexible slotted vane whereby an oil dip stick can be conveniently wiped clean by pulling an edge through the vertex of said symmetrical, V-shaped locating channel, between the opposed interior edges of said slot in said transversely oriented vane, and drawing the dip stick there-along, the opposite interior straight edges of the slotted area of said vane serving as scrapers to remove a major portion of the oil clinging to the stick, the remaining oil on the stick being wiped off by the walls of the slit of said absorbent pad.

4,023,232

WINDSCREEN WIPERS

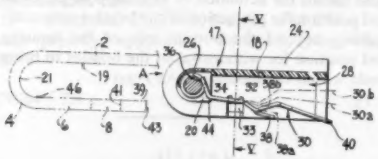
Philip G. K. Smithers, 3 Penwerris Ave., Osterley, Hounslow, Middlesex, England

Filed May 28, 1976, Ser. No. 690,834

Claims priority, application United Kingdom, May 31, 1975, 23738/75

Int. Cl.² B60S 1/40

U.S. Cl. 15—250.32 **6 Claims**



1. In a windscreen wiper arm and blade assembly comprising a wiper blade including a circumferentially grooved mounting pin extending from a side of the blade, defining a shoulder near the end of said pin, a wiper arm having an outer portion formed of a bar and comprising, in succession, a straight main part, a part curved into a semi-circular shape, and a short straight terminal part, parallel to and spaced from a lower face of the main part, the terminal part including a latching element; the improvement comprising an adaptor for securing the arm to the blade, the adaptor comprising a body and a resilient latch member lying at least mainly within the body, the body having surfaces to fit against and substantially conform to the inside curved part of the arm and against the lower face of the main part of the arm, flanges to fit against the side edges of the arm, and a bore to receive the mounting pin, the latch member being pivoted to the body about an axis parallel to the bore, and having a first latching element which is engageable in the groove in the pin of the wiper blade, a second latching element engageable with the latching element of the terminal part of the arm and an actuating element said first latching element extending into said groove and cooperating with said shoulder, thereby preventing withdrawal of said pin from said adaptor.

4,023,233

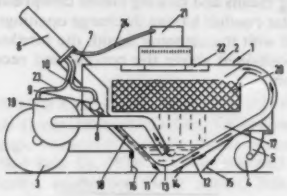
SURFACE CLEANING DEVICE

John Richard Prestwich, Berinsfield, England, assignor to Warwick Pump and Engineering Company Limited, Oxford, Great Britain

Filed Aug. 12, 1975, Ser. No. 603,996

Int. Cl.² A47L 7/00

U.S. Cl. 15—320 **10 Claims**



1. A surface cleaning device comprising nozzle means for directing a high-pressure jet of liquid at an acute angle on to a surface, and collection means for collecting the liquid after deflection from the surface, said collection means includingan inlet duct of approximately constant cross-sectional area having a lower wall terminating with an edge adapted in use to contact the surface ahead of the area of impingement of the jet, whereby in use the liquid jet deflected from the surface co-operates with the duct to create a jet-pump which sucks entrained air, stray liquid, and debris cleaned from the surface, into the duct.

4,023,234

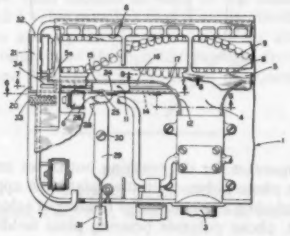
EDGE CLEANING NOZZLE CONSTRUCTION FOR SUCTION CLEANERS

Eugene F. Martinec, East Cleveland, and Max L. Fairaizl, Chagrin Falls, both of Ohio, assignors to Health-Mor, Inc., Chicago, Ill.

Filed Nov. 5, 1975, Ser. No. 628,847

Int. Cl.² A47L 5/00

U.S. Cl. 15—331 **12 Claims**



1. In a multiple-nozzle-opening suction cleaner nozzle construction, housing walls forming an elongated main nozzle opening and a separate elongated edge cleaning secondary nozzle opening oriented at right angles to the main nozzle opening at one end of the latter; main suction duct means having a throat connected with the main nozzle opening; walls forming an auxiliary passage having a rectangular cross section with an area smaller than the cross-sectional area of the main suction duct means; means connecting one end of the auxiliary passage with the suction duct throat and the other auxiliary passage end with the secondary nozzle opening; valve means in the auxiliary passage intermediate the ends of the latter; valve actuator means mounted on the housing and connected with the valve means for moving the valve means between open and closed positions and having an end accessible exteriorly of the housing; and clean-out door means pivoted at one end on the nozzle walls and movable between open and closed positions, said door means extending along

and forming one wall of the rectangular cross section of the auxiliary passage when in closed position and exposing said auxiliary passage when in open position.

4,023,235

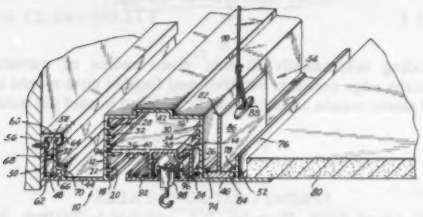
MULTIPURPOSE STRUCTURE FOR SUPPORTING DRAPERY TRACKS, VENETIAN BLINDS, OR THE LIKE

Seymour Cohen, Plainview; Norman Klar, Brooklyn, and David Schwartz, Mineola, all of N.Y., assignors to Master Recessed Systems, Inc., Farmingdale, N.Y.

Filed Mar. 11, 1976, Ser. No. 665,768

Int. Cl.² A47H *1/04*

U.S. Cl. 16—94 D **14 Claims**



1. For use in the support of drapery tracks, Venetian blinds, or the like, an elongated channel having a pair of opposed side walls, which respectively have inner surfaces directed toward each other, and a transverse wall extending between and interconnecting said side walls and forming a top wall from which said side walls extend downwardly when the channel is in an operative position, said channel having an open bottom situated beneath said top wall thereof in said operative position of said channel, and said channel including a plurality of interior ribs extending longitudinally of said channel and fixed to said side walls thereof while extending inwardly from said inner surfaces of said side walls, said ribs at each of said side walls being situated at different elevations when the channel is in said operative position, and said ribs including a plurality of pairs of ribs with the ribs of each pair being respectively situated at said opposed side walls in a common plane, said pairs of ribs including in said operative position of said channel at least two lowermost pairs of ribs, for use in at least the partial support of a drapery track or in the support of blind locks which in turn support one type of Venetian blind, while also including a plurality of pairs of ribs situated higher than said lowermost pairs, closer to said top wall and adapted to be used in connection with another type of Venetian blind, said opposed side walls of said channel having in said operative position of said channel lower edges distant from said top wall, and a pair of horizontal walls fixed to said opposed side walls at said lower edges thereof and projecting laterally from said lower edges, said horizontal walls respectively carrying connecting means extending upwardly from said horizontal walls for connecting said channel with a pair of supporting structures which serve to carry said channel and which engage said connecting means at elevations higher than said horizontal walls in said operative position of said channel.

4,023,236

DUAL-ROLLER SUPPORT FOR OVERHUNG DOORS

Akira Azuma, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 624,227

Claims priority, application Japan, Oct. 21, 1974, 49-127199

Int. Cl.² A47H *15/00*

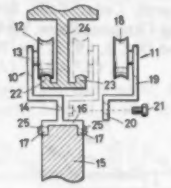
U.S. Cl. 16—97 **3 Claims**

1. A dual-roller support adapted to suspend a door from a pair of parallel spaced overhead tracks, comprising in combination:

a. a first roller for rolling engagement with one of the overhead tracks;

b. a first mount rotatably supporting said roller at its upper end, said first mount having an inverted U-shaped channel portion integral with its lower end and receptive of the upper marginal portion of the door and adapted to be secured thereto, said first mount having a first vertical portion interconnecting the central portion of said inverted U-shaped channel portion with said upper end, whereby said first vertical portion will be disposed in a plane intermediate the overhead tracks;

c. a second roller for rolling engagement with the other of the overhead tracks;



d. a second mount rotatably supporting said second roller at its upper end, said second mount having a second vertical portion at its lower end adapted to be secured directly against said first vertical portion; and

e. means fastening said second mount to said first mount, said means passing through said second vertical portion into said first vertical portion;

whereby, said door can be first suspended from said one overhead track by said first roller and first mount, and said second mount with said second roller can be thereafter installed and fastened to said suspended first mount.

4,023,237

APPARATUS FOR CUTTING OUT THE VENT OF A FOWL

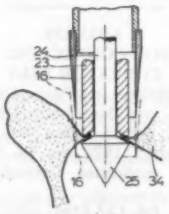
Pieter Meyn, Noordeinde 72, Oostzaan, Netherlands

Filed Apr. 23, 1976, Ser. No. 679,872

Claims priority, application Netherlands, Apr. 29, 1975, 7505057

Int. Cl.² A22C *21/00*

U.S. Cl. 17—11 **5 Claims**



1. Apparatus for cutting out the vent of a fowl, which is hanging by the ankle joints from a hook of an overhead conveyor, comprising a frame, at least one cutting means carried by said frame and means connected with said frame for moving said cutting means along with said conveyor and relative thereto towards and away from said fowl; said cutting means comprising a hollow cylindrical knife mounted for rotation about a center pin, adapted to be inserted into the fowl's vent opening, as the cutting means is moved towards the fowl, for bringing said rotating knife into the right position for cutting out the fowl's vent, and driving means for rotating said knife;

said cutting means further comprising a clamping sleeve slidably mounted on said center pin within said knife, which is axially reciprocable relative to said clamping

sleeve and said center pin, which is provided with an onion-shaped knob at its lower end;

and means for controlling the relative movements of said center pin, said clamping sleeve and said rotating knife in such manner that after said center pin is inserted into the fowl's opening the vent is gripped between the lower edge of said clamping sleeve and the upper surface of said knob, then cut out by said rotating knife without being caught by the knife and finally released again by said clamping sleeve and said center pin.

4,023,238

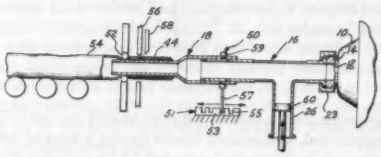
STUFFING MACHINE WITH TELESCOPING NOZZLE

Michael W. Phares, Cedar Falls, Iowa, assignor to Rheem Manufacturing Company, New York, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,378

Int. Cl.² A22C *11/02*

U.S. Cl. 17—41 **6 Claims**



1. In a sausage stuffing machine, having a sausage discharge orifice the improvement of a stuffing horn assembly for attachment to the discharge orifice of the sausage machine, said improvement comprising, in combination:

a. a first tube having a discharge end and an intake end for connection to the discharge orifice;

b. a longitudinally telescoping tube having a telescoping portion with an internal diameter slightly greater than the external diameter of the first tube and fitted on the discharge end of the first tube, said telescoping tube having an outlet end and being longitudinally adjustable along said discharge end, and means on said outlet end for receiving sausage casing thereover whereby the outlet end of the telescoping tube may be inserted partially within a sausage casing during the filling operation and longitudinally withdrawn therefrom during gathering and closing of the casing end; and

c. seal means intermediate the telescoping portions of the tubes.

4,023,239

COUPLNG ROD FOR CONNECTING THE ENDS OF A CONVEYOR BELT

Hermann Stolz, Muhlheim am Main, Germany, assignor to Mato Maschinen- und Metallwarenfabrik Curt Matthael GmbH & Co. KG, Offenbach am Main, Germany

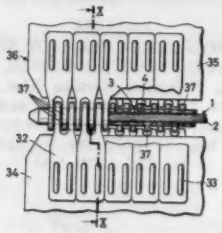
Filed Feb. 5, 1976, Ser. No. 655,616

Claims priority, application Germany, Feb. 21, 1975, 2507474

Int. Cl.² F16G *3/02*

U.S. Cl. 24—33 P **9 Claims**

1. A coupling mechanism for connecting the ends of a conveyor belt to each other along a given axis, comprising belt connecting elements (32) having intermeshing loops (37) at their free ends, means (33) securing said belt connecting elements to said conveyor belt ends in such positions that said loops form a continuous passageway, pin means withdrawably extending through said passageway, said pin means comprising a given radius of curvature (R), flexible core means, sleeve means enveloping said flexible core means, said sleeve means comprising a plurality of elements each of which has a concave end surface and a convex end surface so that adjacent sleeve elements fit into each other, each sleeve element further comprising a bore with a diameter which increases from said concave end surface to said convex end surface, each bore having an arcuate cross-section in the direction of said given axis, said arcuate cross-section opening toward the convex end surface and having a radius of curvature corresponding substantially to said given radius of curvature whereby edge contacts between said flexible core means and said sleeve means are substantially avoided in said pin means.



4,023,240

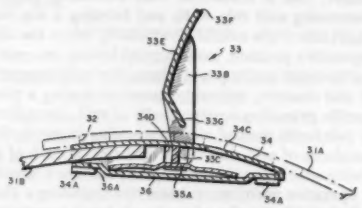
SPRING LOADED BUCKLES

Kurt Albert Rieth, Warwick, R.I., assignor to Textron, Inc., Providence, R.I.

Filed May 21, 1976, Ser. No. 688,681

Int. Cl.² A44B *11/24*

U.S. Cl. 24—188 **19 Claims**



1. A product of the character described comprising:

strip means having one end of the upper surface of which is substantially flat and is adapted to be connected to a buckle and its other end comprising a series of longitudinally spaced transverse apertures,

generally flat spring means,

a buckle comprising,

an end portion having a substantially flat lower surface, a tongue extending forwardly and downwardly from one side thereof for engagement selectively with one of said transverse apertures of said other end of the strip means,

a pair of spaced substantially flat side walls extending forwardly and downwardly from said end portion at opposite sides of said tongue, and

pivot means associated with the forward ends of said side walls for connecting the buckle to said one end of said strip means, said pivot means comprising a portion which is substantially rectangular in cross section and of greater width than thickness, the upper surface of said portion of greater width being substantially parallel to the lower surface of said one end of the strip means and the lower surface of said end portion being substantially parallel to the upper surface of said other end of said strip means when the buckle is in closed position, and

said generally flat spring means engaging said portion of said pivot means,

whereby when the buckle is rotated from its closed position towards its open position the force exerted by said generally flat spring means against said portion of said pivot means is increased and when the buckle is in its

closed position said portion of greater width is substantially parallel to both said one end and said other end of the strip means.

4,023,241

TOP END CONSTRUCTION FOR SLIDE FASTENERS

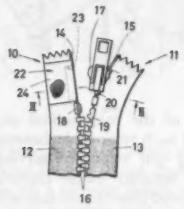
Yoshihiro Kanzaka, Nyuzen, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Dec. 22, 1975, Ser. No. 642,995

Claims priority, application Japan, Dec. 28, 1974, 49-502264[U]

Int. Cl.² A44B *19/36, 19/38*

U.S. Cl. 24—205.11 F **1 Claim**



1. In a slide fastener including a pair of separable stringer tapes each having a bead on one of its longitudinal edges to carry a row of interlocking fastener elements thereon, a slider movable along the rows of interlocking fastener elements for progressively engaging and disengaging the fastener elements to open and close the fastener, and a slider escape mechanism arranged at the upper end of one of the stringer tapes and including an extra length of fastener elements carried on the beaded edge of said one of the stringer tapes, said slider escape mechanism being adapted to permit the slider to ride onto the extra length of fastener elements as desired; the combination thereof with slider release aiding means formed at an upper end portion of the other of the stringer tapes in opposed relationship to the extra length of fastener elements on said one stringer tape, said release aiding means comprising edge means defining a cut-off portion of the bead which is cut off together with the adjacent edge portion of the stringer tape from said upper end portion of said tape; and a reinforcing sheet substantially integrally covering said upper end portion of said other stringer tape, whereby said upper end portion of said other stringer tape is of a thickness less than said bead and thereby readily withdrawable from the slider when same is riding on the extra length of fastener elements on said one stringer tape.

4,023,242

CONNECTOR FOR CONCRETE-REINFORCING TENDONS

Eduardo Caro Roqueta, Barcelona, Spain, assignor to Buildinter A.G., Vaduz, Liechtenstein

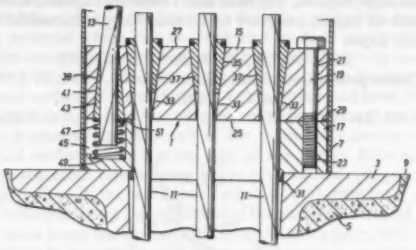
Filed Aug. 19, 1975, Ser. No. 605,939

Claims priority, application United Kingdom, May 14, 1975, 20443/75

Int. Cl.² F16G *11/04;* **E04C** *5/12*

U.S. Cl. 24—122.6 **9 Claims**

1. A connector for connecting a first set of concrete-reinforcing tendons end-to-end to a second set of concrete-reinforcing tendons, comprising a gripping plate and a spacing member adapted to abut the gripping plate, the gripping plate having first and second sets of bores to receive the first and second sets of tendons respectively, each bore providing a frusto-conical seat to receive a gripping wedge for gripping a tendon received in the bore, the frusto-conical seats of the first and second sets of bores tapering respectively towards opposite sides of the connector and one of the sets of bores having, associated with each bore of the set, means for resiliently urging the wedges into their seats, and the resilient means being at least partly housed in said spacing member.



4,023,243

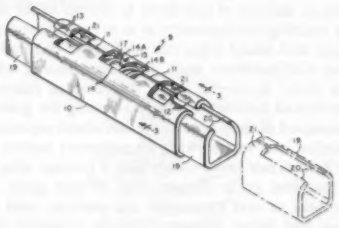
SELF-CONTAINED COMPONENT FOR USE IN MAKING WATCH BANDS

Walter Smith Vargas, North Kingston, R.I., assignor to Textron, Inc., Providence, R.I.

Filed Apr. 28, 1976, Ser. No. 681,072

Int. Cl.² A44C *5/18*

U.S. Cl. 24—265 B **9 Claims**



1. A self-contained component for making an end attachment for a watch band adapted to be mounted between spaced lugs of a wrist watch, comprising a generally tubular member formed from a strip of bendable material and devoid of any lateral projections,

two pairs of tabs, one pair adjacent to one end of said strip and the other adjacent to the other end thereof,

coiled compression spring means within said tubular member,

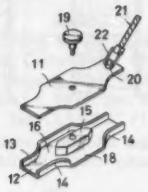
a pair of generally tubular inserts adapted to slide within said generally tubular member, each insert being formed with a generally rectangular slot which has an open outer end and a substantially closed inner end, and

the ends of each of said pairs of tabs being bent inwardly about the opposite longitudinal edges of said generally rectangular slot of the associated generally tubular insert thereby to provide sliding engagement between their inner surfaces and the opposite longitudinal edges of said slot during longitudinal movement of the insert relative to the generally tubular member and to prevent skewing of the insert relative to the axis of the generally tubular member.

4,023,244
EMERGENCY OPENING SLIDER FOR SLIDE FASTENERS

Nobushige Doguchi, Toyama, and Yoshinori Fujisaki, Kurobe, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Oct. 30, 1975, Ser. No. 627,075
Claims priority, application Japan, Nov. 9, 1974, 49-129346
Int. Cl.² A44B *19/26*
U.S. Cl. 24—205.15 E **9 Claims**



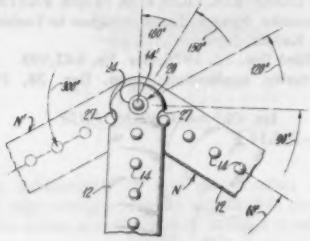
1. In combination with a slide fastener which has a pair of stringers including interlockable rows of fastener elements, an emergency opening slider to be mounted in any selected position on said rows of fastener elements to permit the slide fastener to be forced open from the selected position into an emergency opening configuration, said emergency opening slider comprising a body adapted to define therethrough a guide channel for the rows of fastener elements, said guide channel including contracted terminal portions at both ends and an expanded mid-portion whereby the rows of fastener elements emerge coupled together from either end of said body, and an island separator within said body adapted to divide said expanded mid-portion of said guide channel into a pair of branch channels where the rows of fastener elements are incapable of interlocking engagement, said body including a portion which, upon application of operating force, is movable relative to the rest of said body to set the slider into said emergency opening configuration so as to permit separation of the stringers, said island separator and guide channel having cooperating configurations such that regardless of which direction the slider is moved along the rows of fastener elements, interlocked fastener elements entering the guide channel are decoupled as they pass along the island separator, and then recoupled into interlocking engagement before exiting the guide channel said body comprising a bottom wing having a pair of marginal guide flanges, one of said guide flanges having a recess at said expanded mid-portion, said bottom wing having said island separator fixedly mounted thereon, and a top wing pivotally coupled to said island separator on said bottom wing, said top wing having a maximum width less than the dimension of said recess in the longitudinal direction of said body.

4,023,245
HAND-LOOM CONSTRUCTION

Arturo Zaltzman, Calles de Patriotismo 61, Mexico City, Mexico

Filed July 1, 1975, Ser. No. 592,321
Claims priority, application Mexico, July 2, 1974, 152263
Int. Cl.² D03D *29/00*
U.S. Cl. 28—15 **16 Claims**

1. A hand-loom kit, comprising a plurality of like structural frame modules, each frame module comprising an elongate body with an array of plural upstanding pins spaced at the same regular longitudinal unit-space interval, said body having a fastening aperture at each end, each fastening aperture being spaced by said unit longitudinal interval from the next adjacent pin, the axis of each fastening aperture being also on an alignment determined by projection of the alignment of the axes of the pins of the array, one of said body ends at the apertured region being adapted to assemble over the apertured region at the other end upon assembly of two frame modules to each other, plural removable fastening means each of which is adapted to extend through axially registering apertures of such overlapped ends, each of such fastening means securing two such frame modules and retaining registry of the apertures while also clamping and retaining a preselected

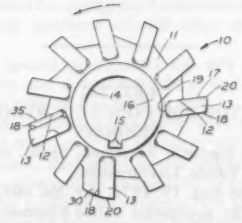


angular orientation of the longitudinal alignments of said frame modules, each such removable fastening means further including upstanding pin structure serving the respective alignments of both secured frame elements, whereby pin structure at each secured interconnection of adjacent modules serves at pin-unit spacing the pin array of both said modules, regardless of the secured angular orientation of said modules.

4,023,246
INSERTED BLADE HOB

Edward W. Haug, and Charles E. Beck, both of Rockford, Ill., assignors to Barber-Colman Company, Rockford, Ill.

Filed Aug. 28, 1975, Ser. No. 608,585
Int. Cl.² B26D *1/12*
U.S. Cl. 29—103 B **3 Claims**



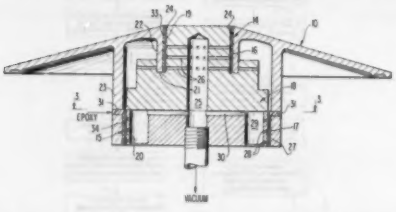
1. An inserted blade hob comprising a core, a preformed slot in the outer periphery of said core and extending axially substantially the length of said core, an elongated cutting blade disposed lengthwise in and extending radially from the preformed slot, substantially parallel from and back surfaces on the blade received snugly in said slot, and a thin layer of high shear strength adhesive in and extending substantially the entire length of the interface between said front and back surfaces of the blade and said slot bonding said cutting blade to the core.

4,023,247

VARIABLE SPEED SHEAVE ASSEMBLIES AND METHOD OF PRODUCING

Lewis E. Baer, Hagerstown, Md.; William A. Williams, Philadelphia, and Carroll G. Wright, Fayetteville, both of Pa., assignors to T. B. Wood's Sons Company, Chambersburg, Pa.

Division of Ser. No. 510,174, Sept. 30, 1974. This application Aug. 6, 1975, Ser. No. 602,250
Int. Cl.² B21D *53/10*
U.S. Cl. 29—149.5 R 6 Claims



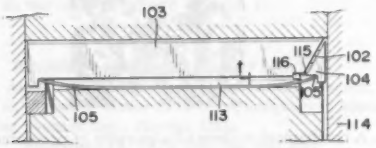
1. A method of making an accurately sized dry lube bearing for a variable speed sheave flange comprising the steps of holding said flange on a vacuum fixture to thereby center the flange in relation to an accurate surface of the fixture, holding a preformed strip of dry lube bearing material on the fixture in contact with said accurate surface, and injecting high modulus hardening material between said preformed strip and an opposing surface of the flange to complete said bearing following the hardening of the high modulus material and the bonding thereof to said preformed strip and said opposing flange surface.

4,023,248

METHOD OF ASSEMBLING APEX SEAL MEANS IN ROTARY PISTON ENGINES

Hiroshi Ozeki, and Noriyuki Kurio, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed June 18, 1975, Ser. No. 587,815
Claims priority, application Japan, June 19, 1974, 49-70491
Int. Cl.² B23P *15/08*; F01C *19/10*
U.S. Cl. 29—156.6 12 Claims



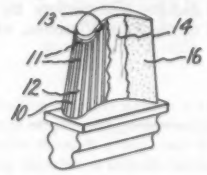
1. Method of assembling apex seal means in rotary piston engines comprising a casing which includes a center housing having a multiple-lobed trochoidal inner wall surface extending between the end faces of said center housing, and a pair of side housings air-tightly secured to the end faces of the center housing to define a cavity with the center housing, and a substantially polygonal rotor defining axially extending apex seal grooves disposed in said cavity with the rotor apices in sliding engagement with the inner wall surface of the center housing, through apex seal means located in the apex seal grooves, said seal means including a main body having a slanted surface at one end, an end piece having a complementary slanted surface and a sealing surface, the slanted surface of said end piece being engaged with the slanted surface of the main body, and elongated spring means having one end engaging the main body and the other end positioned adjacent the slanted surface of the main body, engaging the end piece and normally biasing the end piece radially outwardly so that the biasing force of the spring means, and the coaction between the slanted surfaces biases the end piece radially and axially outwardly forcing the sealing surface of the end piece into sliding sealing engagement with the inner wall surface of the adjacent side housing, the method comprising the steps of; (a) providing a sub-assembly of one of the side housings, the central housing and the rotor, (b) disposing projection means of a material which can be dissipated by heat produced by engine operation between the main body and the spring means to hold retracted the end of the spring means adjacent the slanted surface of the main body, (c) inserting said main body and said spring means into an apex seal groove of said rotor in such a manner that the end of the main body having said slanted surface is facing the side of the center housing to which the other side housing is not yet attached, (d) placing the end piece in the seal groove adjacent said main body and said retained spring means such that the slanted surface of the end piece faces the slanted surface of the main body, with the end piece laying wholly within the center housing, not extending beyond the end face of the center housing, free of external stresses and not biased by said spring means because the spring means is being held retracted, and (e) mounting the other side housing on the end face of said center housing without disturbing the free and unstressed condition of the end piece, whereby the end piece is totally free of the biasing force of said spring means during the entire assembly operation, but is biased radially and axially outward into sealing engagement with the other side housing by the spring means and the coaction of the slanted surfaces when the projection means is dissipated by heat produced in engine operation.

4,023,249

METHOD OF MANUFACTURE OF COOLED TURBINE OR COMPRESSOR BUCKETS

Kenneth A. Darrow, Sprakers, and John W. Daly, Quaker Street, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 25, 1975, Ser. No. 616,563
Int. Cl.² B23P *15/04*
U.S. Cl. 29—156.8 H 9 Claims



1. In the manufacture of a vane adapted for mounting in a machine in which the airfoil surfaces of the vane are to be subjected to contact with hot gas by the method wherein an erosion-corrosion resistant outer layer is applied in the form of hot deformable particles over an airfoil-shaped core and bonded thereto, said core having at least one groove recessed into the airfoil-shaped surface thereof and said outer layer being extended over said at least one groove to define a subsurface passage for the transport of a cooling fluid therethrough during operation, the improvement comprising the steps of:

providing over the airfoil-shaped surface of said core a substrate layer having the outer surface thereof roughened on a macroscopic scale,

brazing said substrate layer along the inner surface thereof to said airfoil-shaped surface of said core extending over any grooves therein,

depositing the erosion-corrosion resistant outer layer over said substrate layer in the form of hot deformable particles interlocking with the roughened outer surface thereof, and

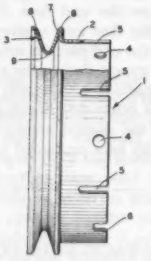
heating the core so coated in a hydrogen environment whereby said erosion-corrosion resistant layer is stress-relieved and bonded to said substrate layer.

4,023,250

METHOD AND APPARATUS FOR MAKING HUBLESS V-GROOVED PULLEY AND PRODUCT

Nolte V. Sproul, Canton, and Michael F. Kark, North Canton, both of Ohio, assignors to Aspro, Incorporated, Westport, Conn.

Filed Aug. 4, 1975, Ser. No. 601,458
Int. Cl.² B21D *53/26*; B21K *1/28*; B21D *22/14*, *22/00*
U.S. Cl. 29—159 R **14 Claims**



1. In a method of making a one-piece, dynamically-balanced, spun, sheet metal pulley formed with a V-groove having a valley and crests, the steps of drawing a cup-shaped sheet metal stage blank having a bottom wall and offset primary and enlarged secondary cylindrical side walls; removing the stage blank bottom wall to form a tubular stage blank having offset primary and enlarged secondary cylindrical walls; then roller spinning a V-shaped groove in the secondary tubular stage blank wall; and locating the primary tubular stage blank wall radially intermediate the location of the valley and crests of the spun V-groove, while spinning the V-groove.

4,023,251

METHOD OF MANUFACTURE OF COOLED TURBINE OR COMPRESSOR BUCKETS

Kenneth A. Darrow, Sprakers, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 30, 1975, Ser. No. 600,306
Int. Cl.² B23P *15/04*
U.S. Cl. 29—156.8 H **12 Claims**

1. In the method of preparing an airfoil-shaped body in which a metal skin is applied over and bonded to an airfoil core by brazing in dry hydrogen or in a vacuum, said core having channels recessed into the surface thereof whereby conduits are defined below said metal skin in the completed body, the improvement comprising the steps of:

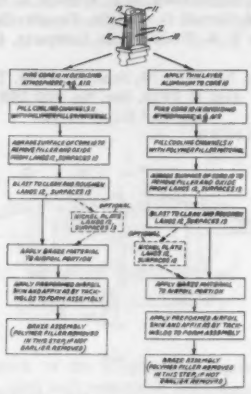
providing a layer of oxide material over the entire surface of said core, said oxide material being stable in dry hydrogen at temperatures at least as high as about 1100° C,

filling said channels with a polymer filler material,

cleaning the surface of said core to remove oxide and polymer material except from the surface area of said channels,

applying braze material to said core,

conforming a preformed metal skin to the surface of said core,



temporarily affixing said skin to the surface of said core to form an assembly and

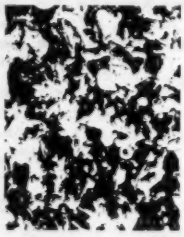
brazing said assembly,

4,023,252

CLEARANCE CONTROL THROUGH A NICKEL-GRAPHITE/ALUMINUM COPPER-BASE ALLOY POWDER MIXTURE

Moses A. Levinstein, and Edward J. Bauersfeld, both of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 12, 1975, Ser. No. 640,324
Int. Cl.² B22F *3/00*, *1/00*
U.S. Cl. 428—650 **4 Claims**



1. A mechanical mixture of a plurality of powdered materials each in the size range of about −150/+ 325 mesh (U.S. Standard Sieve), the mixture comprising, by weight:

greater than about 50% to less than about 80% of an aluminum-copper solid solution alloy powder consisting essentially of, by weight, 90 – 95% Cu, up to 2% of elements selected from the group consisting of Fe and Si, with the balance Al and incidental impurities; and

the balance a nickel-graphite powder consisting essentially of a core of graphite and a shell of nickel, the nickel comprising, by weight, greater than about 50 and less than about 75% of the nickel-graphite powder.

4. A seal member including:

a base portion; and

an abradable coating portion which is the fusion and interaction product of the mixture of claim 1, secured with the base portion,

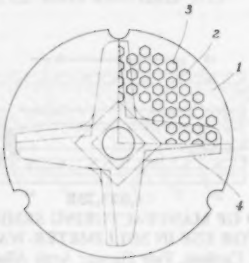
the coating portion comprising a dispersion of graphite particles, a plurality of blocky particles of an aluminum-copper alloy primarily bound with platelets of nickel, the coating portion having a density of about 3.6 – 4.0 grams per cubic centimeter.

4,023,253

GRINDER PLATE FOR MEAT CHOPPERS AND METHOD OF MANUFACTURING THE SAME

Shinnosuke Funakubo, 3-6-1, Gyotoku Ekimae, Ichikawa, Chiba, Japan

Filed Oct. 14, 1975, Ser. No. 621,874
Claims priority, application Japan, July 30, 1975, 50-92071; July 30, 1975, 50-92072
Int. Cl.² C22C *1/04*; A47J *43/25*; B22F *2/00*
U.S. Cl. 428—566 2 Claims



1. A method of manufacturing a discal grinder plate for meat choppers, which comprises

compressedly molding and sintering a powdery metallic mixture into a configuration of said plate having a plurality of spaced polygonal holes extending completely through said plate,

said mixture consisting essentially of 93% by weight of Fe, 2% by weight of Cu, 4% by weight of Ni and 1% by weight of carbon, and the compression molding and sintering of the plate being made at a pressure of approximately 6.0 tons per square centimeter and at a temperature of approximately 1,150° C so as to give the plate a porosity of 5–15%,

subjecting the plate to a heat treatment, and

impregnating the pores of the plate by immersing it into heated oil after the heat treatment, whereby said pores thereof are impregnated with the oil to provide the plate with self-cleaning properties.

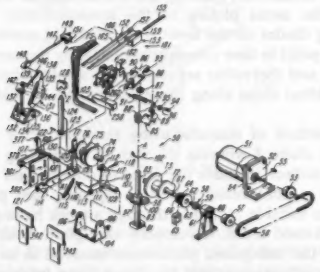
2. A grinder plate for meat choppers produced in accordance with the method defined in claim 1.

4,023,254

PINNING METHOD AND APPARATUS

John R. Aiple, Kettering; Harold N. Grushon, Dayton, and David R. Wisecup, Xenia, all of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Dec. 18, 1975, Ser. No. 641,844
Int. Cl.² G09F *3/12*
U.S. Cl. 29—432.1 29 Claims



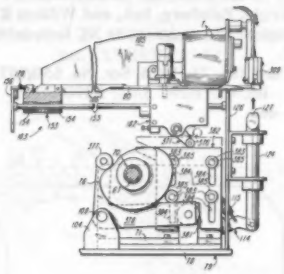
1. Method of pinning a tag to merchandise, comprising the steps of: providing a path along which a tag can be fed, providing an anvil and a plunger cooperable with the anvil, providing a movable pin guiding and crimping member initially spaced from the path, positioning merchandise at a pinning zone between the anvil and the plunger, feeding a tag along the path to the pinning zone, moving the pin guiding and crimping member for the first time toward the plunger, moving the plunger toward the anvil to hold the tag and the merchandise in a bent orientation at the pinning zone, driving a pin through both the tag and the merchandise once, thereafter moving the pin guiding and crimping member a second time away from the plunger to allow the pin to be driven through both the tag and the merchandise again, moving the pin guiding and crimping member a third time toward the plunger while the pin is being driven to bend the pin toward the tag to enable the pin to be driven through the tag again, moving the pin guiding and crimping member a fourth time away from the plunger, and moving the pin guiding and crimping member a fifth time toward the plunger but to a greater extent than during the first and third times while supporting a leading end portion of the pin to crimp the pin.

4,023,255

PINNING METHOD AND APPARATUS

Charles B. Bussard, Kettering, and David R. Wisecup, Xenia, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Dec. 18, 1975, Ser. No. 641,845
Int. Cl.² B27F *7/06*
U.S. Cl. 29—432.1 20 Claims



1. Method of feeding a supply item in a web or sheet form, comprising the steps of: providing a utilization device, moving an impaling member through a sequence from a position in which the impaling member is initially latched in a first position out of contact with the supply item, releasing the impaling member from the first position, impaling the supply item with the impaling member, latching the impaling member in a second position in which the impaling member remains impaled in the supply item but in which the depth of impalement of the impaling member is limited, thereafter moving the impaling member in a forward direction relative to the utilization device while in the second position to cause the supply item to be fed, thereafter moving the impaling member from the second position to the first position in which the impaling member is again away from the supply item.

4,023,256

METHODS OF FASTENING WOOD VENEER SHEETS IN EDGE-TO-EDGE RELATIONSHIP

Autry E. Hurst, 1812 E. Austin, Nacogdoches, Tex. 75961

Division of Ser. No. 475,855, June 4, 1974, Pat. No. 3,911,978.
This application Oct. 3, 1975, Ser. No. 619,192
Int. Cl.² B23P *19/04*
U.S. Cl. 29—433 18 Claims

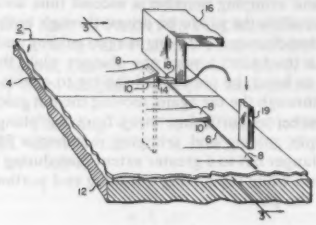
1. The method of fastening together substantially rectangu-

lar wooden veneer sheets in contiguous edge-to-edge relationship which includes

arranging a plurality of sheets in edge-to-edge abuttment,

forming at least one integral fluke-like hook in each sheet, each hook projecting from its sheet at an angle sufficient to provide a notch therebeneath,

threading string-like means through each notch so as to connect contiguous sheets to one another,



depressing each hook into planar relation to its sheet so as to confine a portion of the string-like means against the face of said hook in opposed relation to the other face of said sheet against which adjacent portions of said means are confined, thereby providing a continuous composite strip.

4,023,257

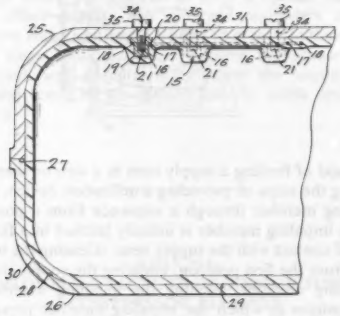
METHOD OF MAKING A HOLLOW ARTICLE HAVING A REINFORCED APERTURE

Stephen J. Wright, Edinburg, Ind., and William K. Neidinger, Mount Prospect, Ill., assignors to NL Industries, Inc., New York, N.Y.

Filed Jan. 21, 1976, Ser. No. 650,957

Int. Cl.² B29C *5/04*; B29D *3/02*

U.S. Cl. 29—460 **3 Claims**



1. In a method for rotationally molding a hollow article in which a mold is charged with a hardenable synthetic resin, the mold is heated to melt the resin, the mold is simultaneously rotated about at least two different axes, and the resin is caused to coat the interior mold surface and to solidify, the improvement comprising: forming a ring-like assembly by interconnecting a plurality of threaded members in spaced apart relationship by at least two spaced wire support members each having an interior opening larger than a desired opening into the hollow article; temporarily releasably securing said assembly to an interior surface of said mold with said interior openings in said support members located in a position surrounding a desired location for said opening into the hollow article; introducing a charge of said resin into said mold; rotationally molding the hollow article to embed said support members and at least partially to embed said threaded members in said resin; after said resin has at least partially solidified, releasing said threaded members from said mold; removing the hollow article from said mold; and forming said opening into said hollow article through the interior openings in said support members, thereby forming a rotationally molded hollow article having a peripherally reinforced opening into such hollow article and also having threaded members disposed about said opening into such article for threadedly attaching another article thereto.

4,023,258

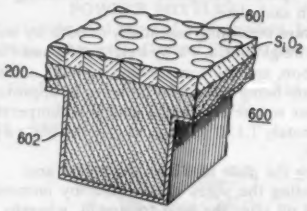
METHOD OF MANUFACTURING SEMICONDUCTOR DIODES FOR USE IN MILLIMETER-WAVE CIRCUITS

Eric Robert Carlson, Fair Haven; Arno Allan Penzias, Highland Park, and Martin Victor Schneider, Holmdel, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 5, 1976, Ser. No. 664,245

Int. Cl.² B01J *17/00*; H01L *21/302*

U.S. Cl. 29—578 **5 Claims**



4. A method of manufacturing millimeter-wave semiconductor diodes from a semiconductor wafer having a back surface and a front surface with an epitaxial layer comprising the steps of depositing an insulating layer on the front surface of said semiconductor wafer, cutting notches in the back surface of said semiconductor wafer in a grid-like pattern to a depth of approximately one-half the thickness of the semiconductor wafer thereby sectioning the semiconductor wafer into a plurality of individual, inseparated chips having side surfaces that are substantially flat and perpendicular to the front surface of said wafer, plating the back surface of said semiconductor wafer including the walls created by said notches with a metallic conductor, heating the semiconductor wafer so as to alloy the metal plating to the semiconductor material, fabricating diodes on the front surface of said semiconductor wafer at a point in time subsequent to heating the semiconductor wafer, and thereafter separating the semiconductor wafer into individual chips along the lines created by said grid-like pattern.

5. A method of manufacturing semiconductor diodes as defined in claim **4** wherein the step of fabricating diodes on the front surface includes the steps of coating said insulating layer with a photoresist material, exposing said photoresist material to suitable radiation through a mask having a plurality of darkened areas, developing said photoresist material, dissolving the unexposed photoresist material so as to expose a plurality of areas on said insulating layer, etching said exposed insulating layer to expose a plurality of areas on said epitaxial layer, and depositing a metallic conductor on the areas of exposed epitaxial layer.

4,023,259
METHOD OF MAKING LIQUID CRYSTAL DISPLAY DEVICE HAVING EXTENDED SERVICE LIFE

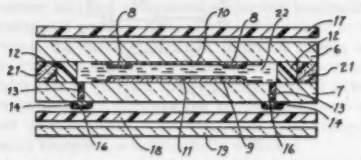
Kanemitsu Kubota, Suwa, and Jin Nagasaki, Shimosuwa, both of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Division of Ser. No. 495,008, Aug. 5, 1974, Pat. No. 3,967,882, which is a continuation-in-part of Ser. No. 242,003, April 7, 1972, abandoned. This application Feb. 23, 1976, Ser. No. 660,578

Claims priority, application Japan, Apr. 9, 1971, 46-22152

Int. Cl.² H01S *4/00*; G02F *1/13*

U.S. Cl. 29—592 10 Claims



1. A process of preparation of a field-effect liquid crystal display device, comprising the steps of depositing a film of a synthetic resin on one surface of each of two glass plates each glass plate having at least one transparent electrode on said one surface, said film being thick enough to be grooved and thin enough to interfere only negligibly with the transmission of visible light therethrough, orienting said films by forming minute unidirectional grooves thereon, bringing said plates together with a spacer therebetween positioned adjacent the edges of said plates to form a cell, at least one of said plates being apertured, said plates being so positioned that said films are on adjacent surfaces and the orientations of said films are at right angles to each other, heating said plates and spacer to a temperature at which said spacer softens but at which said synthetic resin film is undamaged, said spacer being selected to have a softening point below the flow or degradation temperature of said synthetic film, pressing said plates together to cause said spacer to flow and conform to the surface of said plates, and maintaining said plates and spacer at said temperature until essentially all volatiles including moisture are driven off from the interior of said cell.

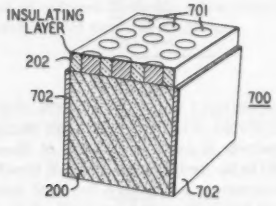
4,023,260
METHOD OF MANUFACTURING SEMICONDUCTOR DIODES FOR USE IN MILLIMETER-WAVE CIRCUITS

Martin Victor Schneider, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 5, 1976, Ser. No. 664,269

Int. Cl.² B01J *17/00*; H01L *21/302*

U.S. Cl. 29—578 5 Claims



4. A method of manufacturing millimeter-wave semiconductor diodes from a semiconductor wafer having a bottom surface and a top surface with an epitaxial layer comprising the steps of depositing an insulating layer on the top surface of said semiconductor wafer, cutting notches in the top surface of said semiconductor wafer in a grid-like pattern to a depth of approximately one-half the thickness of the semiconductor wafer thereby sectioning the semiconductor wafer into a plurality of areas each one which corresponds to an individual, unseparated chip having side surfaces that are substantially flat and perpendicular to the top surface of said wafer, plating the semiconductor material exposed by said notches with a metallic conductor, heating the semiconductor wafer so as to alloy the metal plating to the semiconductor material, fabricating diodes on the remaining top surface of said semiconductor wafer, at a point in time subsequent to heating the semiconductor wafer and thereafter lapping the back surface of the semiconductor wafer so as to separate the wafer into individual chips.

5. A method of manufacturing semiconductor diodes as defined in claim 4 wherein the step of fabricating diodes on the remaining top surface includes the steps of coating the insulating layer remaining after the notching step with a photoresist material, exposing said photoresist material to suitable radiation through a mask having a plurality of darkened areas, developing said photoresist material, dissolving the unexposed photoresist material so as to expose a plurality of areas on said remaining insulating layer, etching the exposed silicon dioxide layer to expose a pluraltiy of areas on said epitaxial layer, and depositing a metallic conductor on the areas of exposed epitaxial layer.

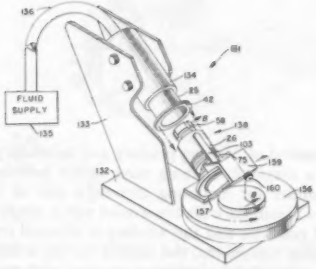
4,023,261
METHOD OF MAKING AN ENCAPSULATED WET MOTOR CIRCULATOR

Leonard A. Piette, Warwick, R.I., assignor to Unipas, Inc., Warwick, R.I.

Filed Apr. 29, 1976, Ser. No. 681,736

Int. Cl.² H02K *15/14*

U.S. Cl. 29—598 9 Claims



1. A method for assembling a subcombination of components for use in a circulator, said subcombination comprising at least an encapsulating sleeve secured about a rotor secured to a shaft, and secured to a plurality of support members for supporting bearings for receiving said shaft within said sleeve, the method comprising the steps of:

applying adhesive to a predetermined location on the interior surface of said sleeve, said location being determined by the position of one of said support members relative to said sleeve in said subcombination; placing a curing fixture on an assembly fixture;

positioning a bearing support member about the shaft at each end respectively of said rotor on said curing fixture adapted to maintain alignment of said rotor and each of said support members;

applying adhesive to said first bearing support member;

aligning said sleeve in a retaining portion of said assembly fixture on the axis defined by said shaft of the component subassembly; and

foreceably ejecting said sleeve from said assembly fixture to cause said sleeve to encapsulate said component subas-

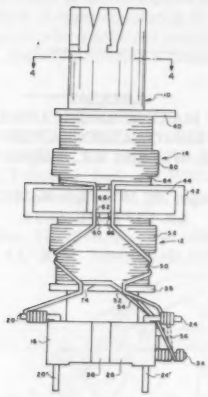
sembly in a precise axial alignment while said subassembly is secured to said curing fixture.

4,023,262

METHOD OF WINDING DIFFERENTIAL COILS ON A MAGNETIC LATCHING REED SWITCH CROSS POINT BOBBIN

Sigitas Miknaitis, Clarendon Hills, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed July 8, 1976, Ser. No. 703,486
Int. Cl.² H01F *41/06*
U.S. Cl. 29—605 6 Claims



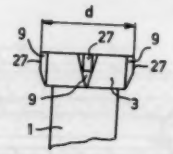
1. A method of winding primary and secondary energizing coils on a magnetic latching reed switch bobbin having an axial chamber for mounting therein a pair of reed switch capsules wherein the coils are wound with a single continuous strand of coil wire and the winding is effected on automatic coil winding equipment, the bobbin having a base flange at one end adapted for supporting primary and secondary coil terminals and associated contact pins for insertion in a receptacle of a wiring circuit which method comprises attaching the end of the coil wire to a primary coil terminal, winding a primary coil in a predetermined direction in a coil area adjacent the base flange, attaching the wire to a connector post and running the wire from the post to a secondary coil terminal, winding a secondary coil on the primary coil in the same direction, feeding the wire to a coil receiving area remote from the base across an intervening shunt plate, winding a primary coil in that area in the opposite direction and feeding the wire back across the shunt plate and the previously wound coils and connecting it to a primary coil terminal and then to an adjacent secondary coil terminal, feeding the wire across the previously wound coils on the adjacent coil receiving area and across the shunt plate, winding the secondary coil on the primary coil in the remote coil receiving area in the direction as the first coil winding, returning the wire across the shunt plate and the first set of primary and secondary windings to the connecting post, and finally removing the wire section connecting the post with the secondary coil terminal and the wire section connecting the last mentioned primary and secondary coil terminals.

4,023,263

METHOD OF MAKING AN ADJUSTING PIN FOR A FERRO-MAGNETIC CORE

Willem Johannes Postma, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 479,902, June 17, 1974, Pat. No. 3,944,958. This application Oct. 23, 1975, Ser. No. 625,019
Claims priority, application Netherlands, June 18, 1973, 7308413
Int. Cl.² H01F *41/02*
U.S. Cl. 29—607 4 Claims



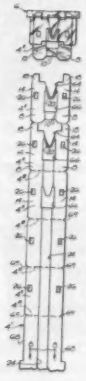
1. A method of making an adjusting pin comprised of a body of ferromagnetic material fit into a cylindrical opening in a ferromagnetic core comprising the steps of forming on one end of said ferromagnetic body a head composed of a rigid synthetic material having longitudinal ridges protruding therefrom, a part of said ridges having a larger diameter than the diameter of said core opening, forming a sharp edge on one end of the core opening sufficient to cut off excess material from said longitudinal ridges, inserting the adjusting pin into the cylindrical opening from the end having the sharp edge until the longitudinal ridges bear on the sharp edge and further displacing the adjusting pin along the axial direction of said opening so that the parts of the adjusting pin longitudinal ridges which project beyond the circumference of the cylindrical opening are cut off by the sharp edge thereby to form an interference fit.

4,023,264

METHOD OF MAKING MINIATURE PLUG-IN FUSES OF DIFFERENT FUSE RATINGS

John Schmidt, Jr., and Avinash Aryamane, both of Mount Prospect, Ill., assignors to Littelfuse, Inc., Des Plaines, Ill.

Filed June 21, 1976, Ser. No. 698,079
Int. Cl.² H01H *69/02*
U.S. Cl. 29—623 14 Claims



1. A method of making plug-in fuse elements having different desired fuse ratings and each comprising a plug-in element including a pair of spaced confronting generally parallel terminal forming blade portions to be received by pressure clip terminals or the like, a pair of confronting current carrying

extensions projecting longitudinally from the inner ends of the pair of terminal forming blade portions and a fuse-forming link portion interconnecting the current carrying extensions, said method comprising the steps of providing substantially identical blank portions of fuse metal for forming fuse elements of different fuse ratings which blank portions are initially provided within the longitudinal margins thereof with longitudinally extending portions of substantially identical reduced thickness and substantially identical width for fuse elements of different fuse ratings to be made therefrom, blanking said portions of reduced thickness of each blank portion to leave on opposite sides thereof a pair of spaced confronting general parallel terminal forming blade portions to be received by pressure clip terminals of the like and confronting current carrying extensions projecting longitudinally from the inner end portions of each pair of terminal forming blade portions, the fuse elements of different ratings being obtained by blanking said longitudinally extending portions of reduced thickness to provide fuse-forming links of substantially different locations between the confronting portions of said current carrying extensions where the heat dissipation characteristics thereof are substantially different.

4,023,265

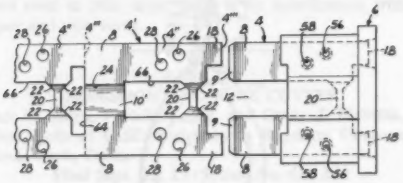
METHOD OF MAKING A MINIATURE PLUG-IN FUSE

Avinash P. Aryamane, Mount Prospect, Ill., assignor to Littelfuse, Inc., Des Plaines, Ill.

Continuation of Ser. No. 640,253, Dec. 12, 1975, abandoned. This application June 2, 1976, Ser. No. 692,040

Int. Cl.² H01H *69/02*

U.S. Cl. 29—623 **18 Claims**



1. The method of making a plug-in fuse element including a plate-like body of fuse metal having a pair of terminal forming blade portions to be received by pressure clip terminals in a mounting panel, current carrying extensions at the inner end portions of the pair of terminal forming blade portions and a fuse-forming link portion interconnecting the current carrying extensions, said method comprising the steps of providing a blank of fuse metal which is initially longitudinally provided throughout its length with a continuous portion of reduced thickness, blanking said blank of fuse metal to leave a pair of juxtaposed, spaced, terminal forming blade portions and current carrying extensions thereof on opposite sides of said portion of reduced thickness, said blanking operation forming in said portion of reduced thickness a fuse-forming link interconnecting said current carrying extension.

4,023,266

PROCESS FOR PREPARING LIQUID METAL ELECTRICAL CONTACT DEVICE

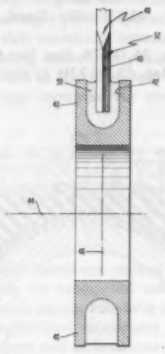
Robert R. Lovell, N. Ridgeville; Frank D. Berkopec, Fairview Park, and David H. Culp, Rocky River, all of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 26, 1976, Ser. No. 708,658

Int. Cl.² H01R *43/00*

U.S. Cl. 29—628 **7 Claims**

1. A process for preparing parts between which electrical contact is to be made comprising the steps of applying a sacrificial metal to said parts over the areas of contact and wetting said areas with a liquid metal which is a solvent for said sacrificial metal, whereby the sacrificial metal is dissolved and the



liquid metal wets the areas underneath the dissolved sacrificial metal.

4,023,267

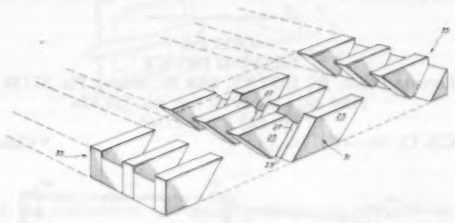
METHOD OF FABRICATING A MAGNETIC CHUCK

Dominic Francis Pignataro, Shrewsbury, Mass., assignor to Walker Magnetics Group, Inc., Worcester, Mass.

Filed May 28, 1976, Ser. No. 691,040

Int. Cl.² B23P *17/04*

U.S. Cl. 29—416 **4 Claims**



1. The method of fabricating a top plate assembly for an interlock magnetic chuck, said method comprising:

providing elongate magnetizable bar stock of rectangular cross-section;

making a series of parallel cuts in said bar stock on a bias to its length thereby to form a succession of flat, parallelogram-shaped pieces;

providing a succession of flat triangular spacers of magnetizable stock, each corresponding to a minor portion of the parallelogram shape;

assembling a series of said parallelogram pieces with alternate pieces being reversed so that the pieces overlap only over a common triangular area, adjacent parallelogram pieces being separated by spacers which are interleaved with the parallelogram pieces at said overlapping triangular areas;

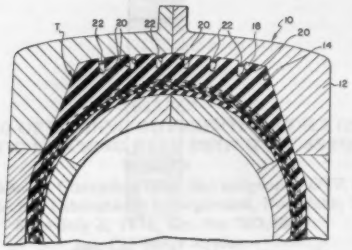
fusion joining the assembled parallelogram pieces and spacers to form a cohesive pole-piece unit; and

assembling said pole-piece unit with at least two other pole-piece units which are at least half similar to the first said pole-piece unit with the projecting parllelogram portions of the respective units being interleaved but spaced thereby to form a top plate assembly for an interlock magnetic chuck.

4,023,268
METHOD OF PRODUCING VENT HOLES IN TIRE MOLDS

Paul G. Momchilov, 424 Seville Road, Wadsworth, Ohio 44281

Filed Jan. 26, 1976, Ser. No. 652,070
Int. Cl.² B22D 31/00
U.S. Cl. 29—527.6 8 Claims

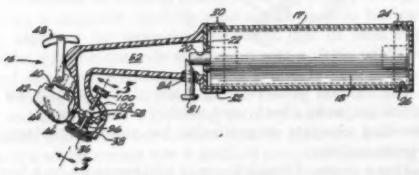


1. A method of producing vent holes in a tire mold made by foundry metal casting processes comprising, forming a female core material having cavities therein defining the tread configuration of a tire, placing extendible tubular means in the cavity portions and extending said tubular means into engagement with the confronting surfaces of the tread forming cavity to orient the tubular means in a desired location in the female core, pouring metal into the cavity portions of the female core so as to produce a tire mold with projections being formed from the solidified metal of the cavity portions wherein the extendible tubular means are encapsulated within the metal projections to provide vent holes, and then removing the core material from the mold leaving the mold with the tread forming projections thereon.

4,023,269
SHAVING DEVICE

Lorenzo Lopez, Jr., 1037 NE. 88th St., Miami, Fla. 33138

Filed Aug. 30, 1976, Ser. No. 718,524
Int. Cl.² B26B 21/44
U.S. Cl. 30—41 9 Claims



1. A shaving device comprising:
a handle of tubular material having a first end and a second end and comprising a housing;
a cartridge in the housing in fitted relation;
a cap means in closing relation of the first end,
means closing the second end and having a through opening and said cartridge having a valve member extending through the opening,
a blade carrying member having a working end and including a stem with an open end fixed about the second end, said stem having a through passageway leading from the open end to the working end,
razor blade carrying means on the working end, and an opening in the working end adjacent the blade carrying means, said opening being in open communication with said passageway, and
valve means normally closing the opening and including a carrier and biasing means yieldable to a force to open the opening and brush means on the carrier, and
an operator exteriorly accessible on the stem for the valve member of the cartridge and means manually mounting the operator on a stem adjacent the second end of said housing and movable between a normal valve member closed position and a valve member open position to permit escape of shaving cream into the passageway to be selectively released by pressure on the brush to open said valve means,

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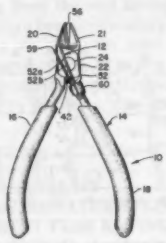
4,023,270
CUTTER WITH WIRE CATCH

James Robert Hellerman, 12622 Elizabeth Way, Tustin, Calif. 92680; Ronald Daniel White, 6466 Saipan, Cypress, Calif. 90630, and Harold Dwaine Palmer, 25942 Corriente Lane, Mission Viejo, Calif. 92675

Filed May 20, 1976, Ser. No. 688,201
Int. Cl.² B26B 17/04
U.S. Cl. 30—124 9 Claims



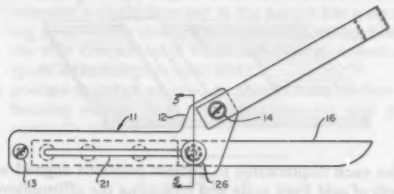
1. The combination of a wire cutter and a wire catch mounted on the cutter to hold a small section of wire as it is clipped from a larger section, said cutter including a pair of pivotally mounted members having handle portions and mating wire clipping jaw portions with the handle portions on one side of the pivot and the jaw portions on the other side, the improvement comprising:
a springy one-piece wire element and means for clamping the element to one of said cutter members;
said wire element having:
a. a catch portion engaging the inner side of said one cutter member and extending adjacent to the cutting edge of the jaw portion of said one cutter member,
b. a retaining tang engaging the outer side of said one cutter member, and
c. means between said catch portion and said tang, dimensioned and positioned so that the springiness of the wire element urges the catch portion and the tang portion against said one cutter member and retains said catch portion adjacent said cutter edge in position to hold, with the other of said cutter members, a section of wire as it is clipped, said means between the catch portion and said tang includes an elongated generally U-shaped portion which extends along said one cutter member, the open ends of said U-shaped portion being spread beyond the untensioned condition of the element to provide the springiness which urges the catch portion and the tang against opposite sides of said one cutter member.

4,023,271

MEAT TRIMMER AND SCRAPER ASSEMBLY

Roy P. Di Franco, 788 Lusterleaf Drive, Sunnyvale, Calif. 94086

Filed Aug. 8, 1975, Ser. No. 610,975
Int. Cl.² B26B 3/04
U.S. Cl. 30—123 6 Claims



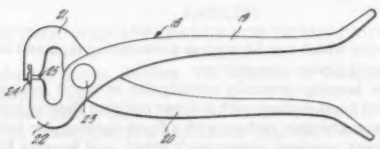
1. A meat trimmer-scraper comprising a trimmer blade, at least one scraper blade in the form of an elongated band, an elongated handle having spaced sides, means for securing the ends of said at least one scraper blade band to the sides at one end of said handle at an angle with respect to the londitudinal axis of the handle so that the edge of said band engages the meat at an angle when the handle is parallel to the meat, and means formed in said handle for receiving and holding said trimmer blade having a cutting edge so that it extends outwardly from said one end of the handle adjacent said scraper blade and substantially parallel to the handle's longitudinal axis with the cutting edge extending in the opposite direction than the scraper blade whereby when the trimmer-scraper is turned over to trim meat there is no interference with the scraper and vice versa.

4,023,272

NON-SHORTING WIRE CUTTER

Dennis C. Siden, Portola Valley, and Corey J. McMills, Los Altos, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Sept. 25, 1975, Ser. No. 616,831
Int. Cl.² B26B 13/02
U.S. Cl. 30—257 15 Claims



1. A non-shorting wire cutter comprising a pair of coacting blades having a blade angle of about 0°, said blades being offset from each other and at least one of said blades being movable relative to the other so that they pass each other as they move through a substrate from opposite sides, said blades being fabricated from a material having a bulk resistivity greater than about 1 ohm-cm and having sufficient hardness relative to their thickness to prevent substantial deformation when the blades are forced through the substrate.

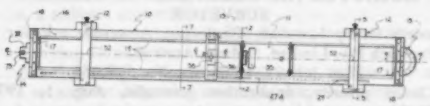
4,023,273

SABRE SAW GUIDE ASSEMBLY

Thomas R. Treleaven, 204 Winnipeg Ave., Thunder Bay, Canada

Filed July 26, 1976, Ser. No. 708,389
Int. Cl.² B27B 9/04, 11/04
U.S. Cl. 30—373 22 Claims

1. In a guide assembly for sabre saws which include a sole plate, a reciprocating saw blade passing through the sole plate, means to adjust the angle of said saw blade relative to the sole plate for bevel cutting, and means to turn the saw blade through 90° for straight ahead cutting or circle cutting; said guide assembly comprising in combination a substantially rectangular frame having a pair of spaced and parallel, longitudinally extending side members, means at each end of said side members extending transversely therebetween to maintain said side members in the aforesaid spaced and parallel relationship, a carriage mounted for endwise sliding move-



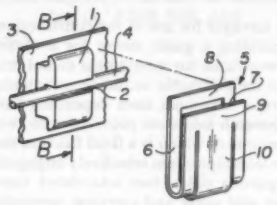
ment between said side members, means on said carriage for detachably supporting an associated sabre saw by the sole plate thereof, adjustable means movable along said side members to limit the longitudinal movement of the said carriage along said side members and at least one center pivot bearing assembly on said frame for pivoting said frame for rotative movement around said center pivot bearing assembly for circle cutting action of said associated sabre saw.

4,023,274

ORTHODONTIC SPRING CLIP

Melvin Wallshein, 8645 Bay Parkway, Brooklyn, N.Y. 11214

Filed June 2, 1975, Ser. No. 583,160
The portion of the term of this patent subsequent to Mar. 18, 1992, has been disclaimed.
Int. Cl.² A61C 7/00
U.S. Cl. 32—14 A 52 Claims



1. An orthodontic spring clip appliance for use with an orthodontic arch wire and with an orthodontic bracket having a front portion and an engaging channel defining portions, said bracket being connectable to a tooth by means of, for example, an orthodontic band, said arch wire extending proximate said bracket, and said channel defining portion of said bracket defining at least a portion of at least one channel for receiving at least a portion of the orthodontic spring clip appliance therein, said spring clip appliance comprising:

a resilient collar portion generally in the shape of a loop and having at least one resiliently displaceable bracket engaging member, said loop-shaped collar having dimensions substantially corresponding to the external dimensions of the portion of the bracket which defines at least a portion of said at least one channel and being made at least partially of a resilient material to permit resilient displacement of said at least one bracket engaging member to increase the size of said loop to thereby permit said loop-shaped collar to be releasably snapped onto said bracket with at least a portion of said loop-shaped collar at least partially received within said at least one channel; and

elongated finger means in the form of at least one biassing finger extending from said collar portion and having a biassing portion spaced to at least one side of said loop and being at least partially and resiliently movable in directions generally transverse to a plane generally defined by said loop and arranged to apply forces toward

the arch wire relative to said bracket to retain said arch wire relative to said bracket, whereby said at least one biassing finger is placed in a condition, when said loop-shaped collar is snapped onto said bracket, to apply said retention forces to said arch wire.

4,023,275

MOUNT FOR THE WORKTABLE OF A DENTAL SURVEYOR

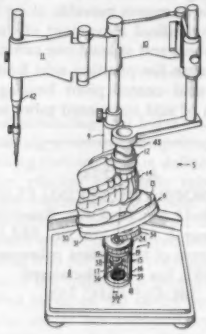
Kenneth Henry Marshall, Castlecrag, Australia, assignor to Premach Pty. Limited, Sydney, Australia

Filed July 22, 1975, Ser. No. 598,055

Claims priority, application Australia, Aug. 1, 1974, 8388/74

Int. Cl.² A61C *3/00*

U.S. Cl. 32—67 **3 Claims**



1. A dental surveyor for use in the construction of a dental aid jig incorporating a guide sleeve for a cutting bur, and comprising a worktable for mounting a dental model, a rotatable mount for the worktable including an adjustable ball and socket support, a telescopic stem depending from said support, a floor beneath said stem provided with two concentric tracks the inner one of which is a fixed fulcrum means, an end portion on the telescopic stem selectively engageable with said tracks, a supporting pillar, two articulated traversing arms mounted upon said pillar and carrying, respectively, and in parallel alignment a stylus and a holder for the sleeve of said dental jig, spring means tending to retain the end portion of said stem in its selected track, an intermediate ball on said stem, and an adjustable clamping housing supporting said intermediate ball and when clamped on said intermediate ball securing said stem against rotation and swivelling, whereby the mean occlusal plane of said worktable is set and secured by relating said stylus to the teeth on said dental model while rotation of said worktable is confined about a fixed fulcrum through register of the end portion of said stem in the inner one of said tracks, and the relative position of said sleeve supported by said holder is set and secured by setting of said worktable at a selected swivelled position while the end portion of said stem is engaged in the outer one of said tracks.

4,023,276

DIAGNOSTIC SCALE FOR INTERPRETATION OF ELECTROCARDIOGRAM

Toshiyuki Furukawa, Takarazuka, and Toshio Kato, Osaka, both of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

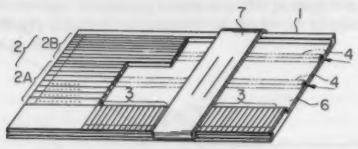
Filed Dec. 22, 1975, Ser. No. 643,102

Claims priority, application Japan, Dec. 28, 1974, 50-4243[U]

Int. Cl.² G09F *9/00;* **A61B** *5/02*

U.S. Cl. 33—1 C **4 Claims**

1. A diagnostic scale for interpretation of electrocardiograms comprising in combination, a fixed substantially rectangular diagnostic scale having a first section arranged along the width of said fixed scale and indicating various interrogation items concerning an electrocardiogram and a second section arranged along the length of said fixed scale and indicating the diagnostic names presumed from the combination of several of these interrogation items, and a plurality of elongated slid-



ing scales each displaceable to distinct positions aligned with the length of said fixed scale and indicating the affirmation or denial to each symptom in the aforesaid interrogation and each having at least one mark aligned with at least one of said diagnostic names in said affirmation position, the alignment of a group of said marks indicating said diagnosis corresponding to said one of said diagnostic names.

4,023,277

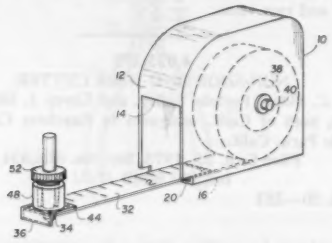
COMBINED MEASURING TAPE AND COMPASS

Charlie W. Fizer, General Delivery, Grassy Meadows, W. Va. 24943

Filed Dec. 29, 1975, Ser. No. 644,731

Int. Cl.² B43L *9/04*

U.S. Cl. 33—27 C **4 Claims**



1. A device which can be used as a measuring tape and as a compass, said device comprising:

a hollow housing generally rectangular in shape having a vertical front surface with a lower opening therein and a horizontal bottom surface with a front opening, the lower and front openings joining each other, said housing having an inner partition which extends vertically upward from the bottom surface and horizontally inward from the front surface to divide the interior of the housing into a small first compartment formed between these surfaces and the partition and a large second compartment in the remainder of the housing, the partition having an opening in the upwardly extending portion;

a tape spool with two ends, the spool being rotatably secured in the second compartment;

a measuring tape attached to the tape spool and rolled up around the spool, the tape having a front end having a hole, which front end extends through the partition opening;

windup means urging the spool to assume a position at which the tape is rolled up around the spool, while permitting the tape to be rolled off the spool against the pressure of the windup means;

a movable brake shoe located parallel to one of the ends of the spool and manually movable towards and away from it;

a brake lining located between the spool and the shoe so as

to be pressed between the shoe and spool when the shoe is moved towards the spool and not to be so pressed when the shoe is moved away from the spool, whereby movement of the spool is prevented when the shoe is moved towards the spool and permitted otherwise;

a holder for detachably receiving a chalk and the like, said holder being secured to the front end of the tape and extending at right angles to the major surfaces of the tape whereby a chalk disposed in the holder has a tip extending downwardly through the hole, said holder fitting into the first compartment when said tape is wound on said spool to its fullest extent; and

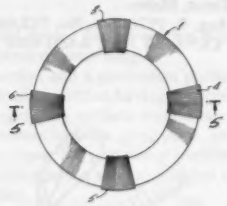
a pointed member secured to said bottom surface of the housing remote from the front opening and pointing vertically downwardly.

4,023,278

TWO AXIS ATTITUDE SENSOR

Charles D. Hoyt, 11955 Humboldt Drive, Northglenn, Colo. 80233

Filed Sept. 5, 1975, Ser. No. 610,751
Int. Cl.² G01C *9/20*
U.S. Cl. 33—377 **1 Claim**



1. A measuring apparatus comprising:

a vessel having a complete toroidal shaped chamber of constant cross section, said chamber being partially filled with a magnetic liquid;

a primary winding enclosing said toroidal shaped chamber;

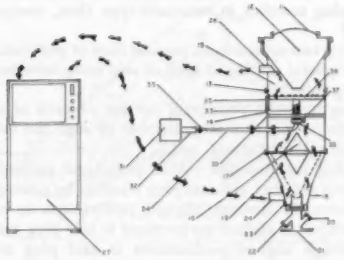
four identical secondary windings enclosing said toroidal shaped chamber, said secondary windings to be equally spaced with respect to each adjacent secondary winding.

4,023,279

METHOD AND APPARATUS FOR DRYING MOLDABLE RESINS

Robert J. Janda, Sterling, Va., assignor to Gammaflux, Inc., Reston, Va.

Continuation-in-part of Ser. No. 288,941, Sept. 14, 1972, Pat. No. 3,834,038. This application Aug. 14, 1974, Ser. No. 497,509
Int. Cl.² F26B *3/34*
U.S. Cl. 34—1 **11 Claims**



1. Apparatus for drying moldable resin particles containing moisture which comprises:

A. a dryer body comprising:

a. a receiving section for receiving moldable resin particles containing an air exit;

b. a load plate attached to said receiving section;

c. a drying section;

d. a first microwave trap mounted between said receiving section and said dryer section whereby said resin particles enter said drying section and microwaves are retained in said drying section;

e. a radiator motor;

f. a radiator mounted atop said radiator motor within said drying section;

g. a dispersing section containing a hot, dry air inlet and an exit for dispersing said moldable resin particles;

h. a second microwave trap mounted between said dryer section and said dispersing section whereby said resin particles enter said dispersing section and microwaves are retained in said drying section;

B. a dehumidifying dryer connected to said hot, dry air inlet and said air exit

C. a means for supplying microwaves to said dryer body which comprises:

a. a microwave source;

b. an isolator connected to said microwave source;

c. a transition section connected to said isolator and said radiator; and

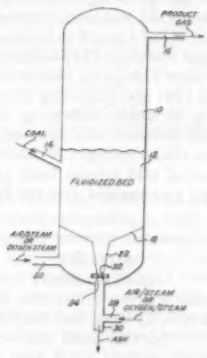
D. means for supporting said dryer body.

4,023,280

VALVE FOR ASH AGGLOMERATION DEVICE

Frank C. Schora, Palatine; John W. Loeding, Naperville, and Jitendra G. Patel, Bollingbrook, all of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed May 12, 1976, Ser. No. 685,617
Int. Cl.² F26B *3/08, 3/08*
U.S. Cl. 34—10 **7 Claims**



1. A process for withdrawing agglomerated solids from a fluidized bed of finely divided solids comprising the steps of:

a. introducing a high velocity gas stream into a vessel containing a bed of fluidized solids through at least one withdrawal passage, said passage being open at the top and having a constricted portion at the bottom to receive a high velocity gas stream;

b. permitting some solids to flow from the fluid bed into said passage around the perimeter thereof;

c. maintaining said solids in the passage as a semi-fixed bed defining, at least in part, the walls of the passage; and

d. adjusting the cross-sectional area of the constricted portion to thereby form the semi-fixed bed as an inverted cone in said passage, the walls of said cone being the walls of the semi-fixed bed, and also to thereby adjust the velocity of the gas stream thereby permitting the selective removal of agglomerated solids from said bed without

removal of finely divided solids therefrom and further permitting efficient reaction of the stream with particles in said bed of fluidized solids.

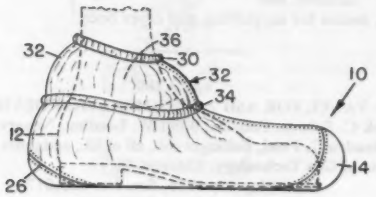
2. In an apparatus for withdrawing agglomerated solids from a fluidized bed of finely divided solids, said apparatus including a vessel for the bed and a withdrawal passage connected to the bottom of the vessel, said passage having a constricted opening, said constricted opening defining a means for directing a quantity of gas into the vessel in a uniform upward velocity and facilitating a flow of agglomerated solids from the vessel, the improvement which comprises an iris valve means in the passage for controlling the velocity of the gas flowing into the vessel during a constant quantity flow of gas into the vessel, for maintaining a uniform upward velocity of gas through the constricted opening, for also controlling the size of agglomerated solids withdrawn from the vessel.

4,023,281

PROTECTIVE FOOT COVERING

Ronnie L. Terry, 9301 Jamaica Drive, Cutler Ridge, Fla. 33157

Filed May 19, 1976, Ser. No. 688,093
Int. Cl.² A43B 3/16, 1/02
U.S. Cl. 36—7.1 R 8 Claims



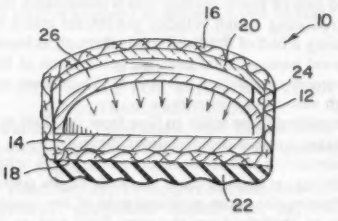
1. A protective foot covering comprising a sole piece (14) having straight side (16) and semi-circular ends (18) and a rectangular piece (20) of a length to be attached to the perimeter (16, 18) of said sole piece (14) completely about its edge, said rectangular piece (20) being also secured together along its meeting edges (28) and extending above said sole piece, thereby providing an ankle embracing tubular body (32) located equidistant between said opposite ends of said sole piece (14), and an elastic selvage (30) secured to and entirely about the top end of said tubular body (32), whereby said covering (10) may be extended over the foot in either direction.

4,023,282

HEATED BOOT

Francis Ziegelheafer, Rte. No. 1, Box 69A, Delmar, Md. 19940

Filed Nov. 2, 1976, Ser. No. 738,311
Int. Cl.² A43B 7/02
U.S. Cl. 36—2.6 1 Claim



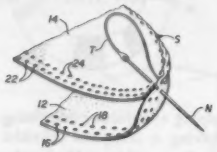
1. An improved hunting boot comprising an overshoe including at least one panel fitted to a wearer's foot substantially from the ankle to toe, a sole member having an outline simulating the shape of the foot, said sole member underlying said at least one panel and extending from a wearer's heel to toes, a thermal sleeve overfitting at least a portion of said overshoe housing the toes of a wearer, said thermal sleeve being secured to said sole member of said overshoe, an adhesive layer, said thermal sleeve being secured to said sole member by said adhesive layer, said adhesive layer underlying said sole member, a pocket, said pocket being defined between said thermal sleeve and said at least one panel of said boot, a catalytic warmer, said catalytic warmer being removably mountable in said pocket, and a replaceable wear resistant tread adhesively secured to said adhesive layer.

4,023,283

MOCCASIN-TYPE SHOE SEAM AND METHOD OF MANUFACTURING SAME

Wilhelm Pfander, Brewer, Maine, assignor to Penobscot Shoe Company, Old Town, Maine

Filed Aug. 9, 1976, Ser. No. 712,646
Int. Cl.² A43B 3/14; A43D 9/00
U.S. Cl. 36—11 10 Claims



1. A moccasin-type shoe comprising:

a vamp member having two lines of perforations extending through the peripheral portion thereof, said peripheral vamp portion being folded to align the two lines of perforations therein, and

a plug member having two lines of perforations extending through the peripheral portion thereof, said peripheral plug portion being folded to align the two lines of perforations therein,

the folded peripheral portion of said vamp member being secured to the folded peripheral portion of said plug member to conceal the edges thereof by a thread passing alternately through aligned perforations in said plug member to aligned perforations in said vamp member and through aligned perforations in said vamp member to aligned perforations in said plug member.

6. A method of forming a seam between a vamp member and a plug member in moccasin-type shoe, comprising the steps of:

forming two substantially parallel lines of perforations in the peripheral portion of each of said vamp member and said plug member.

folding over the peripheral portion of each of said vamp member and said plug member to align the two lines of perforations therein, and

securing together the folded peripheral portions of said vamp member and said plug member by passing a thread alternately through aligned perforations in said vamp member to aligned perforations in said plug member and through aligned perforations in said plug member to aligned perforations in said vamp member,

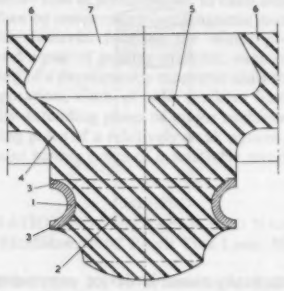
whereby a seam is formed between said vamp member and said plug member wherein the edges thereof are concealed.

4,023,284

ANTI-SLIP DEVICE FOR FOOTWARE

Sverker Rydberg, Nackebo gard, 590 20 Mantorp, Sweden

Filed Apr. 2, 1975, Ser. No. 564,382
Claims priority, application Sweden, Sept. 25, 1974, 7412023
Int. Cl.² A43B *23/28*
U.S. Cl. 36—59 R 33 Claims



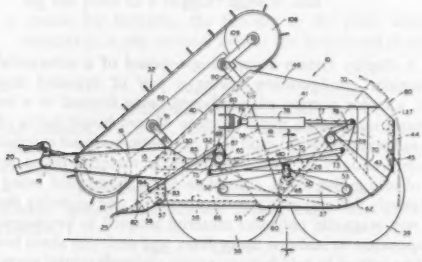
1. An antislip device for preventing slipping on a walking surface, said device comprising:
   a. a base portion and a protrusion portion,
   b. said protrusion portion having a gripping surface section and a nongripping surface section, and
   c. means connecting the protrusion portion to the base portion to cause the protrusion portion to move between a first position and a second position with respect to the base portion,
   d. said nongripping surface section being in contact with the walking surface when the protrusion portion is in the first position,
   e. said gripping surface section being in contact with the walking surface when the protrusion portion is in the second position,
   f. said connecting means having a structural configuration effective to maintain the protrusion portion in said first position when the walking surface is not slippery but effective to cause the protrusion portion to be in said second position when the walking surface is slippery.

4,023,285

FOUR-WHEELED ELEVATING SCRAPER

James E. Hancock, and Howard E. Stuller, both of Lubbock, Tex., assignors to Clark Equipment Company, Buchanan, Mich.

Continuation of Ser. No. 258,619, June 1, 1972, abandoned. This application Feb. 11, 1974, Ser. No. 441,091
Int. Cl.² E02F *7/00*
U.S. Cl. 37—8 11 Claims



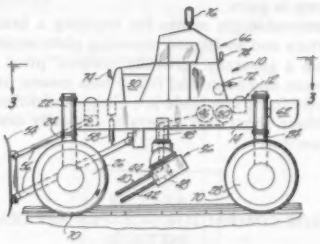
1. In a mobile scraper adapted to be towed by a tractor having a hitch and power takeoff and having an open bowl adapted to be filled with earth material, a cutting blade extending across the front of the bowl, and a bottom door movable to an open position for dumping the earth material from the bowl, the improvement comprising the combination of a slat-type elevator comprising a pair of elevator sections side-by-side on opposite sides of a vertical plane in the center line of the bowl and a pair of tandem running gear means supporting the bowl on a transverse axis including wheel support means pivotally mounted on said transverse axis and extending fore and aft parallel to each other, four ground-engaging wheels, one at each end of said wheel support means rotatably supported one behind the other in tandem ground-engaging fashion, said wheel support means being mounted for independent oscillatory motion about said transverse axis and said slat-type elevator inclined at the front of the bowl generally above the cutting blade, elevator mounting means swingably supporting the elevator permitting it to rise and fall in relationship to the dirt when the blade is in cutting engagement with the ground, elevator drive means at the bottom of said elevator having a power input, said elevator drive means being common to both said elevator sections, a drive line connectable between the tractor power takeoff and said power input, and a tongue for towing the scraper adapted to be coupled to the tractor hitch.

4,023,286

RAILROAD SWITCH SWEEPER

James L. Wickware, Battle Creek, Mich., assignor to N. A. Cobb, Augusta, Mich.

Filed Sept. 4, 1975, Ser. No. 610,174
Int. Cl.² E01H *5/10*
U.S. Cl. 37—14 10 Claims



1. A machine for removing snow from a surface including rails of a railroad track comprising; a body member, ground engaging wheels spaced laterally and longitudinally and supporting said body member in an elevated position relative to said surface and above said wheels, said wheels being spaced laterally a distance greater than the width of said railroad track, means including a flame thrower mounted at the underside of said body member laterally and longitudinally intermediate said wheels, said flame thrower having an elongated barrel mounted for universal angular displacement relative to and at the underside of said body member, and means for moving said barrel to selected angular positions relative to said body member to heat and melt snow on said surface.

4,023,287

PLOW ATTACHMENT FOR SNOW BLOWER

William A. de Brito, 27 Heron Road, East Hartford, Conn. 06118

Filed Mar. 15, 1976, Ser. No. 666,668
Int. Cl.² E01H *5/00*
U.S. Cl. 37—43 R 8 Claims

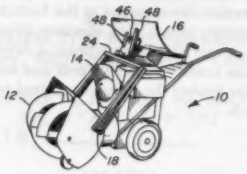
1. A snow removal appliance, said appliance being adapted for attachment to a snow blower having a blade which rotates about an axis, said appliance comprising:
   a frame, said frame having a pair of generally parallel spa-

tially displaced arm means and base means interconnecting first ends of said arm means, said arm means being separated by a distance greater than the width of the rotary blade of a snow blower on which the appliance is to be installed;

means for pivotally connecting the second ends of said frame arm means to a snow blower rearwardly of the axis about which the snow blower rotary blade turns whereby said frame may be pivoted about a generally horizontal axis to place said base means above and rearwardly of the snow blower rotary blade axis or in front of the snow blower rotary blade;

a plow blade;

mounting plate means attached to said frame base means and extending forwardly with respect thereto, said



mounting plate means being provided with a plurality of pin receiving sockets;

bracket means, said bracket means being affixed to the rearwardly disposed side of said blade and being provided with a plurality of spaced apertures, said bracket means apertures being positioned so as to be capable of being brought into registration with said mounting plate means sockets in pairs;

first removable pin means for engaging a bracket means aperture and an aligned mounting plate means socket to define a generally vertically oriented pivot connection between said blade and frame base means; and

means for fixing said blade in a plurality of different angular positions about said generally vertically oriented pivot connection.

4,023,288

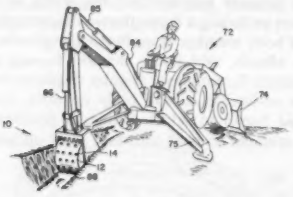
BACKHOE COMPACTOR/SCRAPER APPARATUS AND METHOD

Harry James Roe, 902 Wateka Way, Richardson, Tex. 75080

Division of Ser. No. 442,763, Feb. 15, 1974, Pat. No. 3,891,342. This application Apr. 11, 1975, Ser. No. 567,135

Int. Cl.² E02F *3/76*; **B66F** *9/00*

U.S. Cl. 37—117.5 **8 Claims**



1. A method of filling trench excavations using a backhoe compactor attached to a hydraulically-actuated boom assembly mounted on a tractor, comprising

scraping a layer of fill material into a portion of said trench with a scraper blade on said backhoe compactor; and

compacting said layer of fill material in said trench by applying a substantial amount of the tractor weight through said boom assembly to a cylindrical roller on said backhoe compactor while moving the roller over the fill material in the trench.

4,023,289

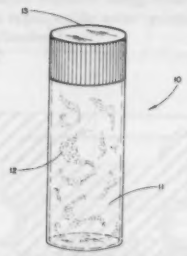
METALLIC POWDER FLUID SUSPENSION

William G. Crawford, 1115 N. Carrizo, No. 1, Midland, Tex. 79701

Continuation of Ser. No. 489,377, July 17, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,283

Int. Cl.² G09F *19/00*

U.S. Cl. 40—106.21 **1 Claim**



1. An aesthetically viewable device comprising a substantially transparent container means, a viewable substance confined within said container means; said substance comprising a solution of greater than ninety percent water and less than five percent soap, consisting of a mixture of water soluble alkali metal group salts of fatty acids, and a quantity of metallic particles held in individual particle suspension within said solution; said metallic particles comprising a powder of metal from a class of metals respective particles of which normally exhibit mutual adherence said substance is comprised of substantially 95 percent water, substantially two percent coloring agent, substantially 2 percent of said soap, and substantially 1 percent of said metallic powder.

4,023,290

CHART DEVICE

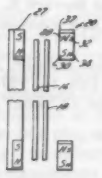
Joseph P. Josephson, 1545 McGregor, Montreal, Quebec, Canada

Continuation-in-part of Ser. No. 541,566, Jan. 16, 1975, abandoned. This application June 18, 1976, Ser. No. 697,388

Claims priority, application Canada, Jan. 21, 1974, 190605

Int. Cl.² G09F *7/04*

U.S. Cl. 40—125 F **9 Claims**



1. A display system comprising a board of a substantially rectangular configuration having a pair of opposed major faces, a major portion of said board being formed of a non-magnetic material, a minor portion of said board being of a ferromagnetic material, said ferromagnetic material extending circumferentially of said non-magnetic material on at least one of said major faces, at least said one major face being of a relatively flat and planar nature, at least one underlay sheet of a non-magnetic polyester material adapted to be placed in juxtaposition to said one major face, said underlay sheet being sized to extend to said ferromagnetic circumferential portion, at least one overlay film of a non-magnetic polyester adapted to be placed on top of said underlay sheet, said overlay film being sized to extend to said minor circumferential portion of

a ferromagnetic material, said overlay film being of a relatively transparent material and being adapted to receive markings from a marking device, and retaining means, said retaining means comprising a plurality of pieces of permanently magnetic material, each of said pieces being of a flexible resinous material having a pair of spaced-apart north and south poles extending longitudinally thereof, each piece having polarity identifying means on one edge thereof, said magnetic retaining means adapted to retain said underlay sheet and said overlay film in juxtaposition to each other and to said one major face by cooperating in a magnetic manner with said ferromagnetic material forming the minor portion of said board, at least a pair of guiding markers, each of said guiding markers being of a permanently magnetic material of a rectangular configuration, each of said markers having a pair of longitudinally extending poles of major surfaces thereof, one surface having poles of a relatively weak nature and the other of the surfaces having poles of a relatively strong nature.

4,023,291

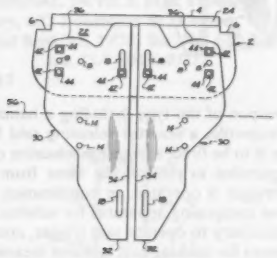
COMBINATION BOOTSCRAPER AND NAMEPLATE

William L. McMillan, 8008 Peach Tree Lane, Wichita, Kans. 67207

Filed June 23, 1976, Ser. No. 698,830

Int. Cl.² G09F 7/00

U.S. Cl. 40—125 H **7 Claims**



1. A combination bootscraper, nameplate and bracket comprising:

a. a plate, on edge, with its long side horizontally disposed, having a straight edge therealong, holes through the metal plate for fastening; a front surface of the plate bearing some form of indicia;

b. a metal bracket having holes for fastening to the metal plate, the bracket being irregular in shape, having a long straight side, a pointed end and a blunt end, the bracket when attached to the plate with its straight side normal to the long side of the plate and the pointed end extending therefrom, forms a stake for supporting the plate and when the bracket is rotated 90° with respect to the plate so that its straight side is parallel to the long side of the plate, the bracket forms a symmetric bracket for attaching the plate to a vertical surface; and

c. means for fastening the bracket to the plate when the bracket is in the vertical and in the horizontal position.

4,023,292

BINDER LOOSE LEAF

Ryoji Shibata, No. 3-45, Higashi Takaai-cho, and Zenzaburo Shibata, No. 4-1, Yuzato-cho, both of Higashi Sumiyoshi, Osaka, Japan

Filed Sept. 1, 1976, Ser. No. 719,868

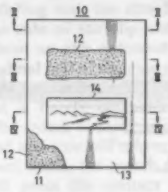
Claims priority, application Japan, Sept. 27, 1975, 50-131465[U]

Int. Cl.² G09F 1/10

U.S. Cl. 40—158 R **5 Claims**

1. A photograph or the like mounting leaf for albums or scrapbooks, comprising:

a generally flat base; a pressure-sensitive non-drying adhesive composition coated over said flat base and over which photographs or the like are applied to be visually held, and a light-friction-removable and ambient-air protection film applied over said adhesive composition



whereby a photograph or the like is applied over said adhesive composition by light-friction removal of a portion of said film commensurate with the size of said photographs or the like.

4,023,293

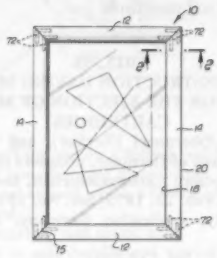
CUSTOM FRAME ASSEMBLY

Margarethe M. Murray, 731 ½ Isabel St., Los Angeles, Calif. 90065

Filed May 26, 1976, Ser. No. 690,255

Int. Cl.² G09F 1/12

U.S. Cl. 40—152 **2 Claims**



1. A picture frame comprising:

45° end mitred frame members abutting on end to define a polygon, each frame member being composed of a front molding wall, a picture rail extending along the inner longitudinal edge of said front molding wall, a peripheral wall extending along the outer longitudinal edge of said front molding wall and one or a plurality of internal supporting walls, the foregoing forming the frame member walls,

wall sections on the rearwardly facing side of said frame members diagonally extending from each of 2 adjoining frame member walls and forming an acute angle therewith, said wall sections proceeding from opposite ends toward one another forming the intermittent wall of a triangularly shaped enclosure consisting of 2 adjoining frame member wall portions and wall sections extending therefrom, said triangularly shaped enclosure constituting the cross sectional surrounds of a passageway longitudinally coextensive with a frame member and angularly aligning with passageways of joining frame members,

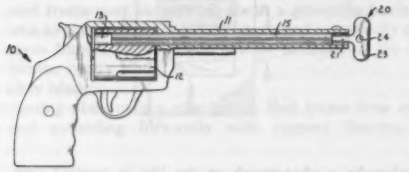
a plurality of interlock keys consisting of 2 legs joined at right angles engaging the passageways of adjoining frame members at their intersections, locking the frame members into angular relation.

4,023,294

SAFETY DEVICE FOR FIREARMS

Joseph P. Knopp, 901 Robert Road, Lincoln, Nebr. 68510

Filed July 19, 1976, Ser. No. 706,391
Int. Cl.² F41C 27/00
U.S. Cl. 42—1 LP 10 Claims



1. A safety device for a firearm having a hollow barrel with a muzzle end and a firing chamber located at the opposite end of the barrel, said device comprising in combination:

an elongate rod adapted to be inserted from said muzzle end into said barrel and firing chamber to grippingly engage the interior wall of said barrel, said rod being shorter in length that the combined length of said barrel and firing chamber;

a tool for inserting and removing said rod from the barrel and firing chamber, said tool including a shank portion smaller in size than said barrel and of sufficient length to push said rod into said firing chamber when said shank portion is inserted into said barrel from the muzzle end; and

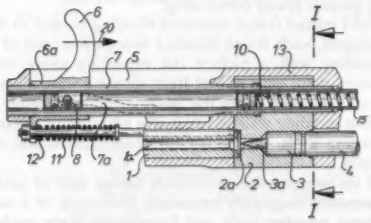
means for coupling said shank portion of the tool with said one end of the rod within said barrel, whereby said tool may be pulled outwardly of the muzzle end of said barrel remove said rod therefrom.

4,023,295

FIREARM CONSTRUCTION HAVING MECHANICAL MEANS FOR THE EJECTION OF MISFIRED CARTRIDGES

Gerhard Hupp, Oberndorf (Neckar), and Helmut Mäder, Schramberg, both of Germany, assignors to Industriewerke Karlsruhe-Augsburg Aktiengesellschaft, Germany

Filed Feb. 20, 1975, Ser. No. 551,085
Claims priority, application Germany, Feb. 21, 1974, 2408396
Int. Cl.² F41C 15/02
U.S. Cl. 42—25 7 Claims



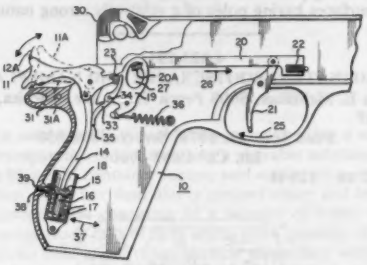
1. A firearm, comprising a gun housing having a side opening, a gun barrel in said housing having a barrel projectile bore, a bearing member rotatably journaled in said housing at a location overlying said barrel, a cartridge holder aligned with the side opening of said housing and connected to said bearing member for rotation therewith and having at least one cartridge chamber alignable with the barrel projectile bore in one position thereof, a charge handle movable backwardly and forwardly on said bearing member and having a hand engageable portion projecting out of said housing, cam means connected between said handle and said bearing member to cause rotation of said bearing member with said cartridge holder around the axis of said bearing member to shift said cartridge holder outwardly of said housing to a cartridge ejection and loading position during movement of said handle, and ejector pin means mounted on said housing in a position aligned with the cartridge chamber when it is in an ejection and loading position for ejecting a cartridge therefrom.

4,023,296

HAMMER ACTUATORS FOR FIREARMS

David M. Frisoli, 2 Homestead Road, Edison, N.J. 08817

Filed Feb. 4, 1976, Ser. No. 655,000
Int. Cl.² F41C 19/00
U.S. Cl. 42—69 B 6 Claims



1. In a weapon of the type including a hammer means for striking a projectile, a sear for releasing said hammer when said weapon is to be fired, a trigger mechanism coupled to said sear and operative to remove the same from said hammer when said trigger is operated, in combination therewith the improvement comprising apparatus for substantially reducing the force necessary to operate said trigger, comprising:

a. first means for cocking said hammer means prior to firing of said weapon relatively at a null point for restraining said hammer means at said null point to cause said hammer means to self-lock relatively independent of said position of said sear, whereby said hammer means define a state of marginal stability,

b. second means coupled to said sear and responsive to said trigger when operative to impart a force to said hammer means in a direction to alter said state of marginal stability to cause said hammer to strike said projectile when said trigger is operated, said second means including a pivotally mounted crank assembly having one end in proximity with said hammer, said crank assembly pivotally mounted on said sear to cause said crank assembly to impart a force to said hammer sufficient to alter said state of marginal stability when said sear is operated by said trigger.

4,023,297

DECOY PRODUCTS FOR GAME BIRDS WITH COMPACT NESTING FACILITIES

Dale E. Jorgensen, 1349 N. St. Albans, St. Paul, Minn. 55117

Filed Oct. 15, 1975, Ser. No. 622,631
Int. Cl.² A01M 31/06
U.S. Cl. 43—3 5 Claims

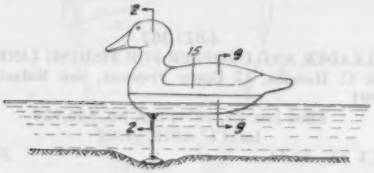
1. A floating, waterfowl decoy constituted substantially throughout of molded, thin plastic sheet material of sufficient rigidity to hold its molded shape but having a degree of flexibility and having a specific gravity approximately 1.00, comprising:

a pair of complemental, concavo-convex shells simulating in external shape the longitudinal contours of the side halfs of the waterfowl imitated;

said shells being connectable in opposed side-by-side rela-

tion along longitudinal opposed edges and being disposable in spread out position for nesting similar decoy shells for compact storage and transportation facilities;

the concavity of said shells being relatively deep in cross sectional dimension to prevent toppling of said assembled decoy due to wind in use, and



a boat-like member constructed of similar material to such shell sections is provided having an upper edge configuration for lapping relation with the lower overall configurations of such shells when secured together, said lapping relation interconnecting said boat member with said shells, said boat-like member increasing the buoyancy and height of the assembled decoy.

4,023,298

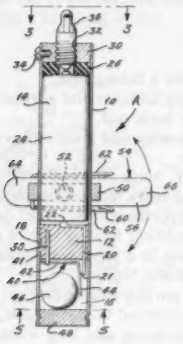
SIGNAL DEVICE FOR FISHING

Donald E. Story, 602 Donaldson St., Canton, Mo. 63435

Filed Sept. 22, 1975, Ser. No. 615,228

Int. Cl.² A01K *97/12*

U.S. Cl. 43—17 **9 Claims**



1. In combination with a fishing pole held in a fixed position and having a fish line depending from it, an improved device for signalling the presence of a fish on the fish line, said device comprising: an elongated case formed from metal and having a hollow interior of cylindrical configuration; a dielectric separator block in the case intermediate its ends and dividing the interior of the case into a battery cavity and a switch cavity, the switch cavity having a bottom wall which extends across the case; a conductor extending through the separator block and having a battery contact located within the battery cavity and a switch contact located in the switch cavity; a battery in the battery cavity and having its one end in contact with the battery contact; an end element on the case at the end of the battery cavity, the end element being removable to expose the interior of the battery cavity so that the battery may be installed in and removed from the battery cavity; a bulb installed in the end element and contacting the other end of the battery at a center thereof, the bulb having a base which is in electrical contact with the case through the end element; a metal contact strip mounted on the dielectric separator block and extending generally axially through the switch cavity; the contact strip being normally spaced from the switch contact but being flexible so that it can be deflected against the switch contact to complete an electrical circuit through the bulb to illuminate the bulb; an actuating element of circular configuration loosely contained within the switch cavity and being of sufficient weight to deflect the contact strip against the switch contact; and a spring clip attached to the case and having jaws which grip the fishing rod to secure the signal device on the fishing rod, the attachment being such that the case is to the side of the clip and may be rotated relative to the clip about an axis extended crosswise to the pole and to the longitudinal axis of the case so that the bottom wall of the switch cavity can be brought to a position wherein the actuating element is barely incapable of pressing the contact strip against the switch contact, whereby when a fish tugs on the line, the rod and case will move, imparting motion to the actuating element within the switch cavity, so that the actuating element will press the contact strip against the switch contact and the bulb will illuminate to indicate the presence of the fish on the line.

4,023,299

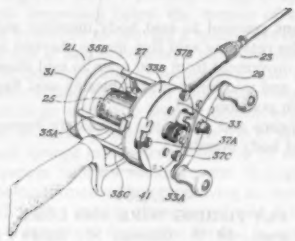
FISHING LINE CUTTER

Robert E. Maserang, 1207 Monterrey Blvd., Apt. 210, Euless, Tex. 76039, and Norman L. Fitzjarrald, 5305 Richland Court, Fort Worth, Tex. 76118

Filed Nov. 24, 1975, Ser. No. 634,918

Int. Cl.² A01K *89/00*

U.S. Cl. 43—25 **3 Claims**



1. A fishing reel for use on a fishing rod for reeling in and unreeling fishing line, said reel comprising:

a rotatable spool around which a fishing line may be wound and unwound,

a handle for rotating said spool; and

a slot formed in said handle and having sharp edges for cutting fishing line.

2. A device for attachment to a fishing reel for cutting fishing line, comprising:

a first portion adapted to engage said reel,

a slotted portion extending from said first portion,

said slotted portion having a slot formed therein with sharp edges for cutting fishing line, and

means for attaching said device to said reel with said first portion engaging said reel and said slotted portion extending away from said reel.

4,023,300

BAIT HOLDER ARRANGEMENT

Alman H. Vieths, 6411 Monterey Road, Space 18, Los Angeles, Calif. 90042

Filed Mar. 2, 1976, Ser. No. 663,054

Int. Cl.² A01K *97/04*

U.S. Cl. 43—41.2 **6 Claims**

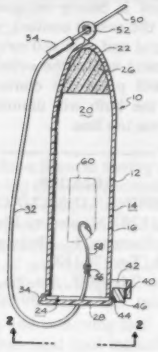
1. A bait holder arrangement of the type adapted to hold the bait during casting thereof and release the bait after the holder enters the water and comprising, in combination:

a body member having a closed end and an open end and walls defining a bait holding cavity between said open end and said closed end;

a flotation means in said bait holding cavity adjacent said

closed end thereof and having a predetermined buoyant force when said body member is immersed in water;

flap means adjacent said open end of said body member and said flap means movable from an open position to allow bait to leave said bait holding cavity to a closed position for retaining bait in said bait holding cavity, and said flap means and said body member defining a line receiving aperture therebetween when said flap mean is in said closed position;



hinge means coupled to said body member and said flap means for retaining said flap means thereon and providing said movement from said open to said closed position thereof, and said hinge means biasing said flap means to said open position; and

said flap means and said hinge means are formed unitarily with said body member.

4,023,301

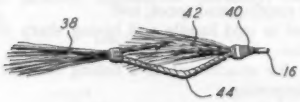
FLY FISHING WIRE AND LURE

Terry P. Warner, 48 W. Genesee St., Baldwinsville, N.Y. 13027

Filed June 18, 1976, Ser. No. 697,385

Int. Cl.² A01K *83/00, 85/08*

U.S. Cl. 43—42.25 **10 Claims**



1. A fishing fly wire comprising:

a. an eye at one end to which a line may be attached;

b. a sharp point at the other end;

c. a first portion extending from said sharp point along a first straight axis;

d. a second portion joined to said first portion at a bend of approximately 180° in the wire and extending in closely spaced relation to said first portion for a distance substantially less than the length of said first portion between said point and said bend;

e. a third portion extending from said second portion at an obtuse angle substantially greater than 90° and less than 180° along a second straight axis; and

f. a fourth portion connecting said third portion with said one end, and including a first section curved from said second axis in a direction toward said first axis, and a second section extending from said first section in a direction away from said first axis.

6. A fly fishing lure comprising:

a. a continuous wire hook having an eye at one end and a sharp point at the other end, said wire being bent back upon itself to form a crimped extremity at a point on said wire farthest from said eye, and a bowed portion between said crimped extremity and said eye; and

b. fly material secured to portions of said wire.

4,023,302

LEADER AND DROPPER FOR FISHING LINES

Dennis C. Hoaglin, 12 Upper Fremont, San Rafael, Calif. 94901

Filed Jan. 21, 1976, Ser. No. 650,924

Int. Cl.² A01K *91/00*

U.S. Cl. 43—42.74 **3 Claims**

1. In a leader for a fishing line,

a dropper having an inner end portion adjacent said leader and an outer hook end,

a connector securing said inner end portion of said dropper to the leader,

said connector being formed with an elongated hole adapted to slidably receive said leader therethrough for rotatably supporting said dropper on said leader,

said connector being formed with a circumferentially extending groove in a plane substantially at right angles to the length of said hole,

said inner end portion of said dropper being formed with a loop snugly received in said groove, and

means rigidly securing said loop within said groove.

4,023,303

FISH MOUTH SPREADER AND HOLDER

Olavi Maunu, 5023 Pinewood Ave., West Palm Beach, Fla. 33407

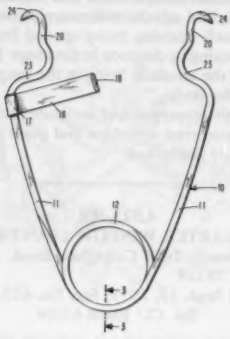
Filed Feb. 25, 1976, Ser. No. 661,296

Int. Cl.² A01K *97/00*

U.S. Cl. 43—53.5 **4 Claims**

1. A combination fish mouth spreader and fish tail holder comprising a unitary spring wire body including a pair of spaced opposed arms, at least a pair of spring coil sections integrally joined with said arms so that one arm extends from one spring coil and the other arm extends from the other spring coil, the spring coils and arms lying in spaced generally parallel planes, said spring coils being tensioned to bias said arms into separated divergent relationship, fish mouth spreader jaws carried by the ends of said arms away from said spring coils, and releasably engageable latch means on said arms for securing the arms in retracted non-spreading positions of general parallelism with said spring coils contracted by torsional action whereby their interior sides are drawn

together axially into fish tail gripping relationship, the coils separating axially when said latch means is released and said



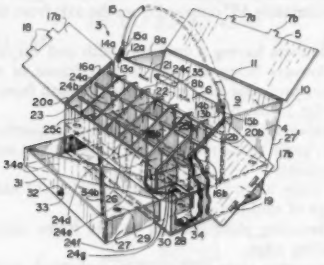
arms are allowed to return to their divergent relationship and the coils are relaxed.

4,023,304

PORTABLE COMPARTMENTED LURE-HOLDING TACKLE BOX

Alex Singer, 29 Jackson Place, Massapequa, N.Y. 11758

Filed June 16, 1976, Ser. No. 696,540
Int. Cl.² A01K *97/04*
U.S. Cl. 43—54.5 R **12 Claims**



1. A portable fishing tackle box comprising in combination: a vessel having a bottom wall, and connected thereto back and side walls extending upwardly from the bottom wall at substantially a peripheral edge thereof; an upright partitioning wall positioned within space defined between the back and side upright walls and adapted to divide the space into a first compartment and a second compartment accessible from a top opening thus formed for each respectively of the first compartment and the second compartment; lure holder means for forming segregated lure-storing spaces segregated by partitioning upright wall structure and having a first lure-storing space formed adjacent a space-defining first wall of predetermined short height adapted for the storage of a lure of short length, and having a second lure-storing space formed adjacent a space-defining second wall of predetermined large height adapted for the storage of a lure of long length, and further for suspending in each of the first and second lure-storing spaces a lure from a suspending structure shaped and positioned for each of the first and second lure-storing spaces to overhang the respective space thereof such that snagging between lures of adjacent segregated lure-storing spaces is avoided, said lure holder means being positioned within at least one of said first and second compartments.

4,023,305

DEVICE TO REMOVE EXCESS WATER FROM PLANT CONTAINERS

Jonas C. Harschel, 8 Mariposa Court, Burlingame, Calif. 94010

Filed Mar. 5, 1975, Ser. No. 555,542
Int. Cl.² A01G *9/02, 27/00*
U.S. Cl. 47—81 **4 Claims**

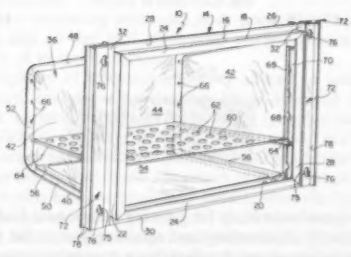
1. A device for removing excess water from a plant container of the type having a bottom and a side wall above said bottom, said device comprising a substantially horizontal plate shaped to fit into said container, said plate being formed to permit water to drain through the plate but to retain soil from passing through the plate, a plurality of legs of approximately equal length depending below the bottom of said plate to engage said container to provide a space between said plate and the bottom of said container, a tube disposed inside said container for drawing water by suction from said space in said container below said plate, said tube extending inside said container through said plate from a bottom position below said plate to an upper position near the top of said container, a transparent syringe connected to the top of said tube and having a squeeze bulb for sucking water through said tube, said plate being formed with a cup having an inside diameter about equal to the outside diameter of said tube, said cup comprising a downward depression formed in said plate, said cup being formed with a detachable water-pervious bottom through which said tube extends, said plate being formed with a plurality of perforations arranged in a plurality of predetermined patterns throughout the plate, said plate being trimmed along selected ones of said perforations to provide one of said predetermined patterns to permit said plate to fit one of a plurality of sizes or shapes of containers.

4,023,306

COLLAPSIBLE WINDOW GREENHOUSE

Nicola Ruggieri, Jr., 44 Rhode Island St., Cranston, R.I. 02920

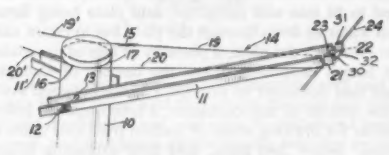
Filed June 14, 1976, Ser. No. 695,947
Int. Cl.² A01G *9/00, 9/02*
U.S. Cl. 47—40 **13 Claims**



1. A collapsible enclosure adapted for positioning in a window opening or the like for use as a greenhouse and including a skeletal frame over which a cover is adapted to fit, said

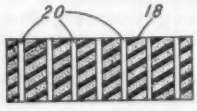
frame comprising a relatively rigid open front member having marginal dimensions corresponding to the opening into which such enclosure is adapted to fit and a pair of opposed support members each mounted to a respective side of said front member for pivotal movement therewith from a closed storage position wherein said supports are generally interfitted within the plane defined by said front frame member to an open position wherein said supports outwardly project therefrom in spaced relation to each other, said cover formed of generally flexible material and open at one end, said cover attached to said front frame member at said one end thereof and adapted for expansion from a closed, generally folded position to an expanded open position wherein portions thereof are supported by said support members, and means for maintaining said support members in said open position.

4,023,307
TRELLIS ARM AND SUPPORT
Earl C. Clark, and William L. Lewis, both of North East, Pa., assignors to Mark Lewis, North East, Pa.
Filed May 4, 1976, Ser. No. 682,841
Int. Cl.² A01G *17/06*
U.S. Cl. 47—46 **5 Claims**



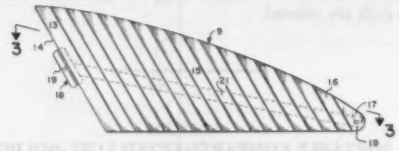
1. A trellis arm and support wire comprising,
a rigid arm having a first and a second end,
means for swingably connecting said first end of said trellis arm to a post,
A trellis wire held to the underside of said second end of said arm by said support wire,
said support wire being disposed in the form of a continuous elongated loop,
one end of said loop located on the topside of said support arm near second end and extending downwardly around said trellis wire in direct contact therewith on each side of said arm of said trellis wire and thereafter extending upwardly to the other end disposed around said post whereby said trellis wire is held in engagement with said arm and said arm is supported against downward swinging.

4,023,308
PLANT GROWTH SUBSTRATE AND PROCESS FOR USING
George L. Staby, 1170 Slade Ave., Columbus, Ohio 43220
Filed Oct. 8, 1975, Ser. No. 620,845
Int. Cl.² A01G *29/00*
U.S. Cl. 47—48.5 **10 Claims**



1. A foraminous body for growing plants, said body having the property of absorbing and retaining water, the improvement including means for deriving a proper moisture-to-oxygen balance at the root structure of said plants, said means comprising:
a plurality of conduits formed in said body, the remaining portions of said body surrounding said conduits being foraminous at least some of said conduits terminating in openings at the surface of said body,
the cross-sectional area of each said conduit being in the range 0.8 to 19.4 square millimeters,
the edge of each opening being spaced from the edge of adjacent openings a distance in the range 1–9 millimeters,
the volume of the conduits being in the range 6–53% of the volume of the body;
whereby, adequate oxygen and moisture simultaneously are derived at said root structure and plant produced gases are effectively dissipated.

4,023,309
REAR QUARTER WINDOW LOUVER PANEL
Lennie E. Backward, 7626 Callaghan Road, Apt. 2616, San Antonio, Tex. 78229
Filed Sept. 15, 1975, Ser. No. 613,071
Int. Cl.² E05B *65/04*
U.S. Cl. 49—62 **5 Claims**

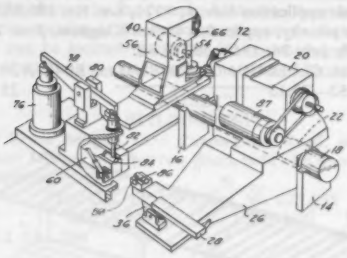


1. A rear quarter window louver panel for automobiles comprising:
a. a substantially rigid louver frame extending from a leading edge to a trailing edge projecting along an axis,
b. a multiplicity of substantially evenly spaced louvers secured to said frame, said louvers projecting at an angle of approximately 45° outward from the axis from the trailing edge,
c. said louvers having a uniform width and varying length, said louvers being secured to said frame in a uniform manner progressively decreasing in length from the leading edge to the trailing edge.
d. attaching means for securing said rear quarter window louver panel to the rear quarter window of an automobile, comprising:
1. a hinge secured to said frame adjacent said leading edge of said frame,
2. a securing plate secured to said frame adjacent said trailing edge,
3. a securing plate bolt projecting through said securing plate,
4. a resilient securing plate washer positioned on said bolt, and
5. a removable securing plate bolt nut positioned on said securing plate bolt, said combination being so constructed and arranged to permit said rear quarter window louver panel to tilt away from a window to which said louver panel is attached when said securing plate nut is removed.

4,023,310
INTERFORM GRINDING MACHINE
John W. Lovely, and Robert N. Hobbs, both of Springfield, Vt., assignors to Bryant Grinder Corporation, Springfield, Vt.
Filed Dec. 29, 1975, Ser. No. 645,257
Int. Cl.² B24B *53/12*
U.S. Cl. 51—5 D **17 Claims**

1. A grinding machine comprising: a base, a slidebar mounted on the base, a wheelhead adapted to receive a grinding wheel and being mounted on the base, a workslide adapted to receive workpieces mounted on the bar for longitudinal and rotational movement with respect thereto, a dresser assembly mounted on the bar for rotational movement about the bar in

the plane of the wheel, first power means connected to the workslide to move the workslide longitudinally along the bar for longitudinal feed, and second power means connected to the dresser assembly to control the rotational movement



thereof about the slidebar, the workslide being movable into overlapping contacting relationship with the dresser housing to be rotated therewith to move said workpieces into said wheel.

4,023,311

DEVICE FOR FINE HONING CRANKSHAFTS

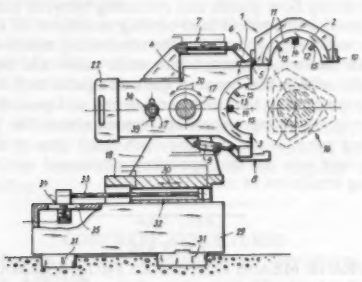
Wilhelm Naumann, Cologne; Wolfgang Littmann, Ranzel, and Rudolf Aussem, Hennef, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Apr. 10, 1975, Ser. No. 566,684

Claims priority, application Germany, Apr. 11, 1974, 2417725

Int. Cl.² B24B *5/42*

U.S. Cl. 51—31 **19 Claims**



15. A device for the fine honing of a substantially cylindrical surface, especially a crankshaft bearing, which comprises; a support, a frame slidable on the support in a direction at right angles to the axis of the surface to be machined, a housing pivotally mounted on the support on an axis parallel to the axis of the surface to be machined, an annular tool holder rotatable in the housing and adapted to support radially inwardly directed honing means therein and also adapted to receive a cylindrical surface to be honed therein and on the axis of rotation thereof, means for driving said tool holder and the surface to be machined in relative rotation, means for oscillating said tool holder and surface to be machined in relative axial reciprocation, the surface to be machined being nonrotatably supported during the honing thereof, a rocker pivoted on said frame and supporting said housing, an eccentric drive on said frame connected with said rocker for oscillating the rocker in the direction of the axis of said tool holder, and means for halting said eccentric drive with the rocker in the center of the path of oscillation thereof.

4,023,312

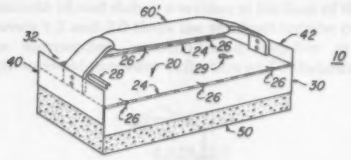
GRILL CLEANING APPARATUS

Jon O. Stickney, P.O. Box 89, Lewiston, Idaho 83501

Filed Sept. 8, 1975, Ser. No. 611,118

Int. Cl.² B23F *21/03*

U.S. Cl. 51—205 R **2 Claims**



1. Apparatus for grill cleaning which comprises:

a carriage;

a pair of side plates pivotally secured to and downwardly depending from said carriage, each of said side plates including a plurality of inwardly projecting spikes for engaging a grill brick, and at least one constant force spring acting between the carriage and side plate for placing a constant inward pressure on a grill brick;

a pair of end plates immovably secured to the terminal ends of said carriage; and

a grill brick located between said end plates and said side plates.

4,023,313

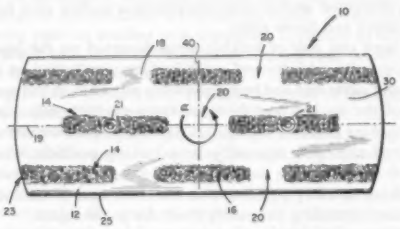
ROTARY SANDING AND STRIPPING BLADE

Lawrence LeBlanc, 204 Leslie St., Houma, La. 70360

Filed Aug. 1, 1975, Ser. No. 601,170

Int. Cl.² B24D *7/02, 7/18*

U.S. Cl. 51—209 R **9 Claims**



1. A blade for a rotary motion stripping tool for removing material from a surface, the blade comprising:

a generally rectangular plate-like main body portion, one planar surface of which forms a substantially flat work surface; and

means for mounting said main body portion on said stripping tool so that said main body portion rotates in the plane of its work surface;

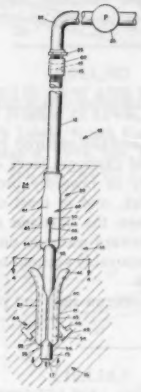
a multiplicity of abrading elements affixed to said work surface, said abrading elements being arranged on said work surface in spaced apart strips lying substantially parallel to each other and to the major axis of said blade, and oriented so as to be essentially perpendicular to the minor axis of said blade, the length of said strips along the major axis being substantially greater than the length of said strips along the minor axis, said strips being spaced apart both along the major and minor axes of said blade, the spaces between said strips being large enough to enable the material removed from the surface being treated to be guided into said spaces and away from the stripping tool along said substantially flat work surface of said main body portion during the stripping operation.

4,023,314

MOBILE HOME ANCHOR AND A METHOD FOR EMBEDDING SAME

Donald L. Tanner, Rte. 1, Box 16A, Hartford, Mich. 49057

Filed Oct. 2, 1975, Ser. No. 618,882
Int. Cl.² E04B 7/00; E04D 5/74
U.S. Cl. 52—23 15 Claims



1. A self-embedding mobile home anchor for securing a mobile home to solid, dry ground comprising:

an elongated anchor post comprising a hollow pipe having upper and lower ends;

at least one pair of locking arms mounted on the pipe on opposite sides thereof, each locking arm having an inner and outer end and being pivotably movable on the outside of the anchor post from an entry position, wherein the locking arm lays flat against the anchor post with its outer end extending upwardly, to a locking position, wherein the locking arm is pivoted downwardly and outwardly from its entry position with the outer end of the locking arm extending outwardly from the anchor post;

movement limiting means for preventing the locking arm from pivoting outwardly and downwardly past its locking position, said movement limiting means including the inner ends of the locking arms, said inner ends being formed such that when the arms are pivoted downwardly and outwardly to their locking positions, at least a portion of the inner end of each arm fits over the outside of the anchor post and engages the same portion of the other locking arm, engagement of the inner ends of the locking arm preventing further downward and outward pivotal movement of the arms past their locking positions and preventing inward force on the locking arms from deforming inwardly the hollow pipe, said locking arms including lip means on the outer ends thereof for causing the locking arms to pivot from their entry to their locking positions when the anchor is embedded in the ground and an upward force is exerted on the anchor; and

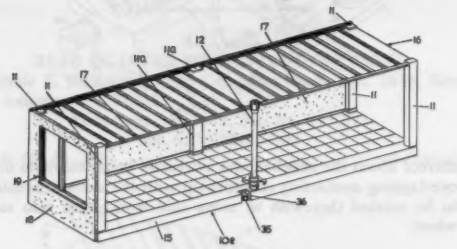
means for receiving water under pressure in the open upper end of the anchor post, said water being directed downwardly through the anchor post and discharged from the lower end thereof so as to embed the anchor in the ground.

4,023,315

PREFABRICATED BUILDINGS

Fritz Christophe Stucky, Zug, Switzerland, assignor to Elcon A.G., Zug, Switzerland

Continuation of Ser. No. 844,384, July 24, 1969, abandoned. This application Nov. 4, 1971, Ser. No. 195,882
Claims priority, application United Kingdom, June 7, 1969, 28917/69; July 26, 1968, 35710/68
Int. Cl.² E04H 1/04; E04B 1/343; E04C 3/20
U.S. Cl. 52—79.13 21 Claims



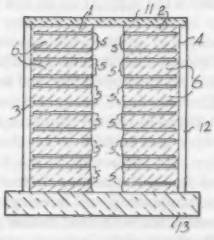
1. A building comprising a lower storey having an open floor area that is free of vertical load-bearing structure and having permanently preinstalled spaced-apart vertical load-bearing structures rigidly secured to and located at the perimeter of the open floor area at positions opposite each other, and an upper storey having at least two adjoining transportable prefabricated room elements, each of which includes a structural floor panel having a peripheral face that is in abutting relation to a face of the floor panel of the other room element to form a joint between adjacent floor panels, the floor panels of said adjoining elements overlying the open floor area of the lower storey and being supported at their respective perimeters by the vertical load-bearing structures of the lower storey and having reinforcing means spanning the upper storey floor panels and extending between said oppositely-positioned vertical load-bearing structures of the lower storey and bridging the joint, the reinforcing means including a metal beam constructed into each panel and registering end-wise with a like beam in the other panel and means for rigidly connecting the beams end to end and providing beam action in sustaining associated stresses across the joint and carrying panel loads over the open floor area of the lower storey and into the said oppositely-positioned vertical load-bearing structures of the lower storey.

4,023,316

STORAGE MEANS FOR ASHES FROM CREMATIONS

Peter D. Martin, 78 Ayton Ave., Fulham, Australia (5024)

Filed July 7, 1976, Ser. No. 703,132
Int. Cl.² E04H 13/00
U.S. Cl. 52—100 5 Claims



1. An arrangement for holding cremation ashes including a

support member having a decorative outer upright face and, within the support member behind and leaving unbroken the decorative face, a plurality of spaced apart parallel apertures opening into a face opposite the decorative face and arranged so that by pressure applied against the front of the decorative face, this decorative face can be broken to the extent so as to leave an opening to the selected aperture so that cremation ashes can be located therein and a commemorative plaque secured to close the said opening into the selected aperture.

4,023,317

BUILDING UNIT

Lloyd Erwin Bettger, 1335 Cunningham Road, and Charles Albert Jensen, 740 Sparrow Road, both of Kelowna, British Columbia, Canada

Filed Oct. 14, 1975, Ser. No. 622,058
Int. Cl.² E04D *1/36*; E06B *1/04*
U.S. Cl. 52—204 6 Claims

1. A building formed from a plurality of building units attached to each other, each unit comprising a panel having an inner surface and an outer surface;

a flange extending outwardly from the periphery of the panel, the flange of each unit being able to abut the flanges of an adjacent unit;

holes formed in at least one of any pair of abutting flanges;

threaded members attached to or insertable through the second of said any pair of abutting flanges and insertable through said holes formed in said at least one of any pair of abutting flanges;

a nut threadedly engaged on each threaded member to secure the flanges of said any pair to each other;

an outer, flexible, hollow sealing strip fitting over and seal sealing attached, abutting flanges, said strip having gripping means on its inner surface providing positive location of the strip over a pair of attached, abutting flanges;

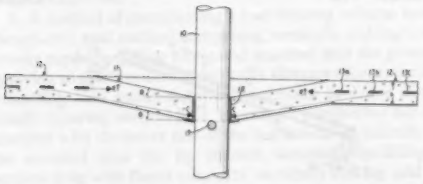
a sealing strip located over each joint between attached building units and connected at the interior of the building.

4,023,318

CONCRETE STRUCTURES

Peter Edington Ellen, 16 Cornwall Ave., Turramurra 2074, Sydney, Australia

Filed Feb. 10, 1976, Ser. No. 656,948
Claims priority, application Australia, Feb. 13, 1975, 0597/75
Int. Cl.² E04C *3/20*; E04B *1/18*
U.S. Cl. 52—231 5 Claims



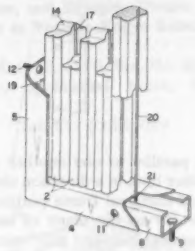
1. A structure comprising a horizontal concrete slab and a plurality of vertical columns passing through said slab, said slab being formed at at least some of said columns with a depressed region of polygonal outline and having flat triangular sides forming an angle having a tangent equal to between 0.1 and 0.35 with the plane of the slab, said slab being of substantially uniform thickness at and outside said regions, said slab being provided with post-tensioned stressing members in strips surrounding each of said depressed regions and having widths equal to at most 12 times the slab thickness, each of said regions having the shape of an inverted pyramid centered on the respective column, whereby the strength of the concrete of said slab in a section at the face of the column is between 1.3 and 2.0 times the resultant tension component of the surrounding post-tensioned member at ultimate strength to avoid excessive deflection and unbalance in thrust lines.

4,023,319

CURTAIN WALL ASSEMBLY OF INTERFITTING GLASS BLOCKS

Takao Kurata, 739-1, Oaza-Gokan, Tsukiyonomachi, Tone, Gunma, Japan

Filed June 9, 1975, Ser. No. 584,727
Int. Cl.² E04C *1/42*; E04H *1/00*
U.S. Cl. 52—308 5 Claims



1. A decorative, non-load-bearing glass wall structure comprising, in combination, a supporting frame, horizontally adjoining pairs of bracing rods supported vertically by said supporting frame, each of the pairs of bracing rods consisting of two horizontally spaced apart rods, each rod of each pair being in close contact with the adjoining rod of the adjoining pair, a plurality of glass blocks laid up between the spaced apart rods of each pair, each of said glass blocks having a pair of vertical side grooves engaging the rods, respectively, one of each pair of the rods having a top end portion which is shiftable upward away from the remaining part of the rod to provide between the rods of each pair of widened horizontal spacing through and from which the glass blocks can be slid down between the rods of the pair during the laying operating of the glass blocks.

4,023,320

ORNAMENTAL PLASTIC SHUTTER

James W. Jackson, East Walpole, Mass., assignor to Bird & Son, Inc., East Walpole, Mass.

Filed July 16, 1976, Ser. No. 706,061
Int. Cl.² E06B *7/08*, *9/00*
U.S. Cl. 52—473 7 Claims

1. An integrally molded one-piece plastic shutter including marginal frame portions of generally U-shaped configuration providing

peripheral front surfaces including top, bottom and side surfaces

peripheral inner and outer surfaces including top, bottom and side surfaces and

peripheral inner and outer rear edges including top, bottom and side edges and

a plurality of discrete slats extending between said inner side surfaces

said slats being generally flat with front surfaces sloping downwardly from their upper rearward edges in a direction from the inner peripheral rear side edges of said marginal frame portions downwardly toward the peripheral front side surfaces of said marginal frame portions,

said slats having a lower forward edge portion extending rearwardly beyond the rear surfaces thereof providing a thickened bottom edge surface

said slats being parallel to one another and being spaced from one another both in a direction along said inner side surfaces of said marginal frame portions and in a direction perpendicular to the plane of said slats providing substantial openings between their rearwardly extending lower edge portions and their upper edges to simulate the appearance of a conventional wooden shutter.

4,023,321

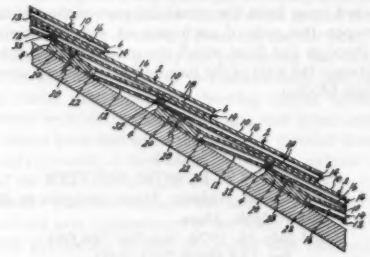
LAYERED ROOFING SHINGLE WITH DEAD-AIR SPACE

Robert L. Smith, Newkirk, Okla., assignor to Billy G. Powers, Arkansas City, Kans.

Filed Jan. 30, 1975, Ser. No. 545,472

Int. Cl.² E04D *1/28, 1/30*

U.S. Cl. 52—553 **2 Claims**



1. A generally rectangular roofing shingle adapted to be applied to a sloping roof so as to have upper and lower edges transverse to the slope of the roof and side edges parallel to said slope, said shingle comprising:

a. an outer layer of flexible material,

b. an inner layer of flexible material,

c. an intermediate layer providing an air space between outer and inner layers, said intermediate layer comprising a series of generally parallel tubular members extending at right angles to the upper and lower edges of the shingle, each of said tubular members opening through the lower edge of said shingle and terminating in spaced relation below the upper edge of the shingle, and a spacer strip of solid, flexible material disposed between said outer and inner layers between the upper ends of said tubular members and the upper edge of said shingle, said spacer strip being spaced apart from the upper ends of said tubular members whereby to form an air passage interconnecting all of said tubular members at their upper ends, and means sealing the ends of said air passage at the respective side edges of said shingle, and

d. means bonding said outer, inner and intermediate layers together to form a unitary structure, said shingle being adapted to be secured to a roof structure adjacent its upper edge, whereby said elongated tubular members of said intermediate layer serve to stiffen said shingle against flexure normally to its plane about any axis parallel to its upper and lower edges.

4,023,322

THERMALLY INSULATING MATERIAL

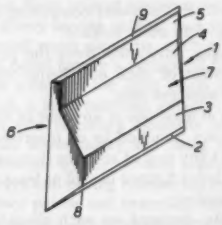
Lionel S. Hughes, Port Talbot, Wales, assignor to British Steel Corporation, London, England

Filed Feb. 23, 1975, Ser. No. 660,187

Claims priority, application United Kingdom, Feb. 26, 1975, 8044/75

Int. Cl.² B31F *1/14;* **E04C** *1/12*

U.S. Cl. 52—608 **22 Claims**



1. A tile for lining an ingot mould or detachable top therefor comprising a rear face for abutting the wall of the mould or top and a front face including surfaces substantially parallel and inclined to the rear face, there being a first inclined surface adjoining and, in the lined mould or top, disposed below a first parallel substantially planar surface wherein the separation between the rear and front faces is at a maximum in the region between the rear face and the first parallel surface.

4,023,323

CONSTRUCTION ELEMENT

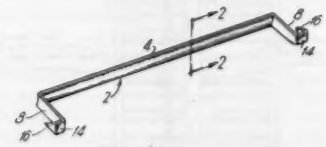
Jean Marie Fortin, 1996 St. Henri Blvd., Mascouche, Quebec, Canada

Filed Dec. 30, 1975, Ser. No. 645,446

Claims priority, application Canada, Nov. 21, 1975, 240187

Int. Cl.² E04C *5/00;* **E04B** *2/00*

U.S. Cl. 52—712 **5 Claims**



1. A unitary construction element adapted particularly for use in the securement of insulation batts or boards between framing or studding members,

the element having a generally U-shape and comprising an

elongated central body section of a length to be received between two adjacent stud members of standard spacing without deformation,

the ends of the body section being angled with respect to the body section providing lateral arms of a length less than the depth of the framing members,

the ends of the lateral arms being angled providing longitudinal arm sections which are substantially parallel with the longitudinal axis of the body section,

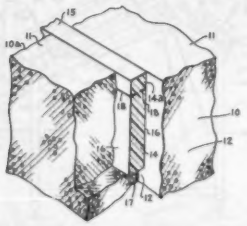
and pointed flanges extending inwardly from the outer ends of the longitudinal arm sections for driving penetration into outer surfaces of the framing members.

4,023,324

METHODS OF MAKING EXPANSION JOINTS FOR ROADS AND BUILDINGS

Harry Majeske, c/o Majeske Bros., 6 Roberta Ave., Collingdale, Pa. 19023

Filed Jan. 8, 1976, Ser. No. 647,339
Int. Cl.² E04B 1/62, 1/00
U.S. Cl. 52—396 3 Claims



1. The method of making an expansion joint which comprises

selecting a main strip of flexible closed pore plastic foam from the group consisting of stabilized foams of polyethylene, polyvinyl chloride, neoprene and polypropylene,

slitting the main strip longitudinally along opposite sides at a location spaced from one edge to a depth insufficient to fully sever said main strip thereby providing a separable strip portion and a remaining strip portion connected to each other by unslitted parts of the main strip,

placing said slitted main strip against a panel,

forming a panel adjacent to and in contact with said slitted main strip,

removing the separable strip portion, and

applying sealant material between the panels and in covering relation to the remaining strip portion.

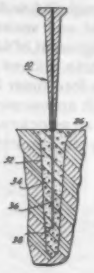
4,023,325

LOAD BEARING REINFORCED GROUND SLAB

Grisha H. Paverman, 200 E. 64th St., New York, N.Y. 10021

Filed Nov. 11, 1975, Ser. No. 631,160
Int. Cl.² E04B 1/00; E04C 3/30
U.S. Cl. 52—742 11 Claims

1. A method of constructing a load bearing column in situ in the ground, said method comprising vertically sinking a downwardly tapering hollow elongated mandrel into the ground by applying to said mandrel a vertically vibratory force, vertically extracting said mandrel from the ground to leave a downwardly tapering vertical hole, inserting a reinforcing bar in the mandrel with the lower end of the bar extending laterally from the mandrel near the tip thereof, substantially filling said vertical hole with fluent concrete, vertically sinking said mandrel into said vertical hole a second time by applying to said mandrel a vertically vibratory force and with the reinforcing bar therein, whereby the concrete is expanded into the soil adjacent to said hole and said bar is emplaced in said hole, extracting said mandrel from said hole a second time while leaving the bar in the hole with its lower end anchored in the concrete to draw the bar out of the mandrel as the mandrel is



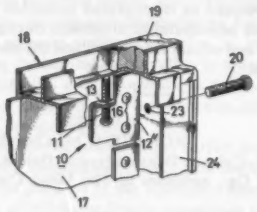
extracted from the concrete filled hole, and allowing the concrete to set so as to form the load bearing column in situ.

4,023,326

SASH HAVING RAIL WITH ADJUSTING DEVICE

Akira Azuma, Uozu, and Kiyohide Hirano, Toyama, both of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 12, 1976, Ser. No. 666,202
Claims priority, application Japan, Mar. 19, 1975, 50-37737
Int. Cl.² F16B 7/04
U.S. Cl. 52—217 4 Claims



1. In a sash having a vertically adjustable horizontal top rail, the improvement of an adjusting device, said adjusting device comprising, in combination therewith;

a. a supporting member fixedly secured to a vertical surface of the sash and disposed beneath said top rail;

b. a wing projecting horizontally from one side of said supporting member in fixed relation to said vertical surface, said wing being disposed at a height lower than the upper edge of said supporting member and having a screw hole with a vertical axis; and

c. a vertical adjusting screw disposed in said screw hole in engagement with a downwardly facing portion of said top rail.

4,023,327

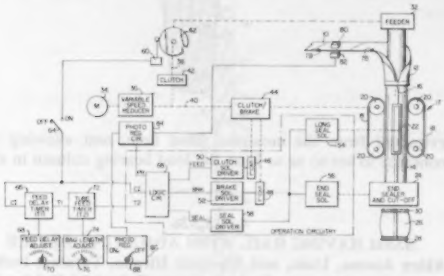
CONTROL SYSTEM FOR PACKAGE MAKING MACHINE

Charles J. Simmons, East Longmeadow, Mass., assignor to Package Machinery Company, East Longmeadow, Mass.

Filed June 4, 1976, Ser. No. 693,266
Int. Cl.² B65B 57/12, 9/08
U.S. Cl. 53—51 20 Claims

1. The combination in a machine for making packages by transversely sealing a tube of packaging material at spaced points along its length of: a means providing a tube of packaging material, an end sealer with operated and non-operated conditions for flattening said tube along a zone extending transversely of said tube and for sealing the opposite flattened

sides of said tube to one another along said transversely extending zone, relative motion drive means having powered and non-powered modes for feeding, during its powered mode, said tube and said end sealer relative to one another from alignment of said end sealer with one transverse seal zone of said tube to alignment of said end sealer with the next such transverse seal zone, means for producing bag making cycle initiate signals, a feed timer for generating a feed signal in consequence of each appearance of a cycle initiate signal, said feed timer having an associated manually operable means for selectively varying the duration of said feed signal, and



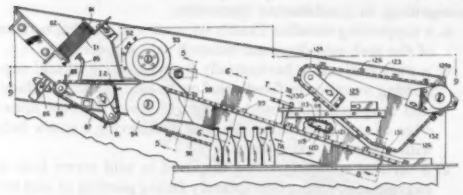
operation circuitry responsive to at least said feed signal for controlling the operation of said relative motion drive means and said end sealer so that at the start of said feed signal said relative motion drive means is shifted from its non-powered to its powered mode and at the end of said feed signal said relative motion drive means is shifted from its powered to its non-powered mode, and so that said end sealer is shifted from its non-operated to its operated condition and subsequently back to its non-operated condition during the interval between the end of said feed signal and the start of the next such feed signal.

4,023,328

PACKAGING MACHINE

Rodney K. Calvert, Dunwoody, and Dale K. Scott, Jonesboro, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Jan. 20, 1976, Ser. No. 650,805
Int. Cl.² B65B *21/06*
U.S. Cl. 53—157 **4 Claims**



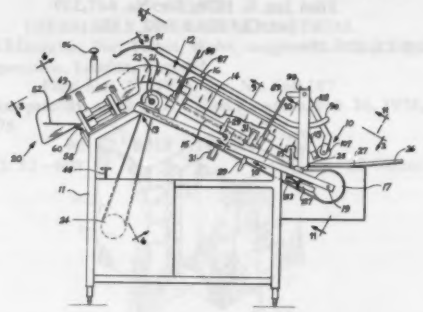
1. In a carton loading machine in which containers are arranged in side-by-side rows prior to loading into a carton, said containers being continuously driven through a partition depositing station whereat a separating partition is transferred onto a group of containers, an improved device, for folding an article separating partition tab out of the plane of a partition panel to which the tab is foldably joined along a hinge line and for depositing said panel and tab into a group of bottles, wherein the improvement comprises means for advancing a group of bottles along a substantially horizontal path, means for advancing said panel at a predetermined velocity along a predetermined path disposed above and at a downwardly inclined angle to said horizontal path, an endless element having a tab folding reach substantially parallel to said predetermined path and an approach reach disposed at an angle to said predetermined path, the velocity of movement of said endless element being such that its velocity along said tab folding reach is in excess of the velocity of movement of said panel, and a tab folder mounted on said endless element and engageable with said partition tab so as to fold said partition tab along said hinge line and out of the plane of said panel, said panel and said tab being lowered into said group of bottles due to the downwardly inclined angle of said means for advancing said panel.

4,023,329

POULTRY PACKAGING APPARATUS

Vytautas Kupcikevicius, and Vytas Andrew Raudys, both of Chicago, Ill., assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 10, 1975, Ser. No. 548,699
Int. Cl.² B65B *1/06*
U.S. Cl. 53—259 **15 Claims**



1. Apparatus for packaging an article in a close fitting flexible plastic film packaging bag comprising, in combination:

a. a structural frame having a proximal end and a distal end;

b. a conveyor mounted movably on said frame, having a first end located at the proximal end of said frame, and having a second end located at a point removed from the proximal end of said frame;

c. an article cradle surmounting the conveyor, arranged to pick up an article at the proximal end of the frame and maintain said article in a preselected packaging orientation during transport thereof;

d. article alignment means at the proximal end of the frame arranged and disposed to position an article being packaged into a preselected packaging orientation for pickup engagement by the article cradle surmounting the conveyor;

e. packaging bag holding means at the distal end of the frame, positioned at an elevation below said second conveyor end;

f. a gravity slide extending downwardly from said second conveyor end to said bag holding means; and,

g. article guide means extending substantially parallel with said gravity slide, arranged to maintain said article in said preselected packaging orientation while it is on said gravity slide.

4,023,330

WRAPPING MACHINES

John W. Williams, Jacksonville, Fla., assignor to Terminal Paper Bag Co., Yulee, Fla.

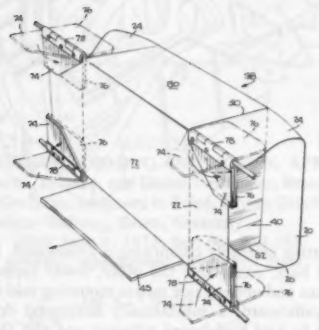
Filed Nov. 21, 1975, Ser. No. 634,171
Int. Cl.² B65B *49/14*, *49/08*, *11/12*
U.S. Cl. 53—378 **6 Claims**

1. In a machine for forming bundles of articles wrapped in a tubular wrapper including a first panel having a first flap at each end thereof, an opposed second panel having a second flap at each end thereof, and a pair of opposed third panels

interposed between said first and second panels respectively, each of said third panels having third flaps at the ends thereof, the combination comprising:

an elongated substantially flat conveyor having a longitudinal line of movement for carrying said bundle through a series of bundle wrapping stations;

a first stationary station disposed adjacent the inlet end of said conveyor for receiving a turbular wrapper with said flaps extending substantially straight outwardly and transversely with respect to said longitudinal line of movement of the conveyor and for forming an end closure at each end of the bundle, four pairs of spaced folding wings disposed in said first station, each of said pairs being movable between an open position and a closed position to each form a corner fold line between said second flap and the adjacent third flap respectively, the folding wings of each pair being hingedly connected together by hinge means, means mounting said folding wings so that in their open position they are substantially parallel to the third panels in a first plane extending transversely of said longitudinal line of movement of the conveyor and in their closed position they are substantially parallel to the second panel in a second plane normal to the first plane extending transversely of the longitudinal line of movement of the conveyor, the folding wings of each pair also partially folding each of said third flaps inwardly with respect to said conveyor when moving from their open position to their closed position;



a second station, said conveyor serving to carry a bundle from said first station to said second station, means adjacent each side of the conveyor in said second station for folding said second flaps inwardly with respect to said conveyor to partially cover said third flaps respectively;

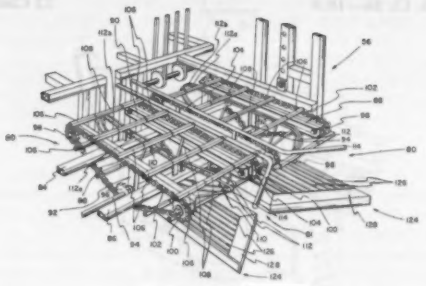
a third station, said conveyor serving to carry a bundle from said second station to said third station, means adjacent each side of the conveyor in said third station for applying a line of adhesive extending across said second flap and partially across each of said third flaps;

a fourth station, said conveyor serving to carry a bundle from said third station to said fourth station, means adjacent each side of the conveyor in said fourth station for completing the inward folding with respect to the conveyor of said third flaps and for folding said first flap inwardly with respect to the conveyor to engage said line of adhesive to seal the bundle.

4,023,331
AUTOMATIC TOBACCO HARVESTER AND DEFOLIATOR ASSEMBLY THEREFOR

C. Albert Gregory, and R. Lane Gregory, both of Rte. 2, Angier, N.C. 27501

Filed July 10, 1975, Ser. No. 594,638
Int. Cl.² A01D *45/16*
U.S. Cl. 56—27.5 9 Claims



1. A tractor mountable automatic tobacco harvester adapted to be connected to and supported by a farm tractor, said tobacco mountable automatic tobacco harvester comprising:

a. frame structure means adapted to operatively connect to said tractor and to extend therefrom;

b. a pair of defoliator assemblies supported by said frame structure means in lateral spaced apart relationship so as to define a row opening area therebetween for receiving and allowing tobacco stalks of the row to pass therethrough during the harvesting operation in order that said defoliator assemblies may cooperate to defoliate leaves from respective stalks passing therebetween, each defoliator assembly comprising:

b 1. a driven endless defoliator finger carrier means movable generally longitudinally back and forth between front and rear portions of the defoliator assembly;

b 2. a plurality of defoliator fingers operatively connected to and carried by said defoliator finger carrier means and movable relative thereto between an inwardly extended defoliating position and a retracted non-defoliating position wherein in said extended defoliating position said defoliator fingers project into the plane of the tobacco stalk row passing between said defoliator assemblies and adjacent respective stalks so as to engage certain tobacco leaves of the stalk and to defoliate the leaves therefrom as the tobacco harvester is driven along the row and wherein in said non-defoliating position said defoliator fingers being retracted from the plane of the tobacco stalk row and ineffective to defoliate leaves from the tobacco stalk passing between said defoliator assemblies;

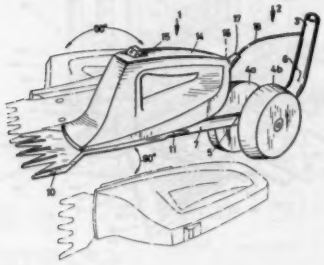
b 3. actuating means for moving respective defoliator fingers between said defoliating and non-defoliating positions in response to the travel of said defoliator finger carrier means at predetermined times in the movement cycle thereof such that each of said defoliator finger means remains in said defoliating and non-defoliating positions during certain portions of the carrier finger means movement cycle; and

c. conveyor means operatively associated with said defoliator assemblies for receiving the defoliated tobacco leaves therefrom and for conveying the defoliated leaves to a collection area that is normally operatively associated with said tobacco harvester.

4,023,332
POWER GRASS SHEARS

Dieter Achenbach, Betzdorf; Siegfried Joswig, Kausen, and Walter Kolb, Betzdorf, all of Germany, assignors to Wolf-Gerate GmbH, Germany

Filed Aug. 8, 1975, Ser. No. 603,233
Claims priority, application Germany, Aug. 8, 1974, 2438360; Jan. 21, 1975, 2502327
Int. Cl.² A01G 3/06
U.S. Cl. 56—16.9 22 Claims

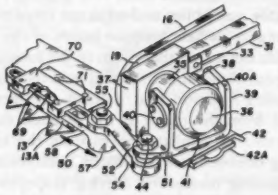


1. Power grass shears means, comprising:
grass shears located in a cutting plane and being operative to shear grass; means for operating said shears; said shears including a plug-in opening for a connecting piece;
a handle, including a rod which is angled to extend generally in said cutting plane toward said shears;
a separate connecting piece interposed between said shears and said handle rod for connecting said shears and said handle rod together to enable relative rotation of said shears about the axis of said handle rod; said connecting piece comprising a plug portion extending into said shears plug-in opening; said connecting piece further comprising a rotary portion in engagement with said handle rod;
locking means for locking said shears at a particular one of a plurality of rotative positions with respect to said handle rod.

4,023,333
FLOATING SICKLE DRIVE

Charles Merton Anderson, Mankato, Minn., assignor to Year-A-Round Cab Corporation, Mankato, Minn.

Filed Apr. 14, 1975, Ser. No. 567,625
Int. Cl.² A01D 55/02
U.S. Cl. 56—296 11 Claims

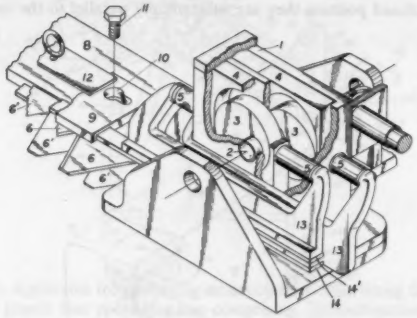


1. In combination with a cutting bar and axially elongated cutting tool means moving in a linear reciprocatory path relative to said bar, drive means mountably secured to said cutting bar for converting rotational drive motion to linear reciprocatory motion for driving said cutting tool means and comprising:
a. wobble shaft drive means including a driven shaft having an axial offset portion, pulley means fast on said driven shaft, first and second bearing means mounted on said driven shaft and including a first bearing means coupled to said cutter bar and a second bearing means mounted about said axial offset portion, yoke means including a generally U shaped yoke member coupled to said second bearing means and to said cutter bar means and having connecting arm means coupling said U shaped yoke member to said cutting tool means;
b. said connecting arm means being generally axially aligned with said cutting tool means and including first and second link means with said first link means having first and second ball and socket joints coupled to opposed ends thereof, with said first link means being coupled to said U shaped yoke member through said first ball and socket joint, and to said second link means through said second ball and socket joint.

4,023,334
MOWING MACHINE

Harry Charles Heath, 8930 Burgess Road, Colorado Springs, Colo. 80908

Filed Dec. 26, 1973, Ser. No. 428,330
Int. Cl.² A01D 55/02
U.S. Cl. 56—297 1 Claim



1. A cutting assembly comprising a knifeboard, two coacting cutter bars, one above the other, lower supporting and guide means and upper guide means mounting said cutter bars on said knifeboard, a substantially horizontal driven shaft supported by said knifeboard adjacent one end thereof, two eccentric cams mounted on said driven shaft, means connecting each of said cams with one of said cutter bars such that the cutter bars reciprocate in opposite directions when the shaft is driven, said shaft being aligned coaxially with pivotal mounting means that permit the entire cutting assembly to assume positions above and below the horizontal during operation, said knifeboard being provided with upstanding bolts, said upper guide means having keyhole slots, the narrow portions of said slots surrounding said bolts when assembled and means locking or securing said upper guide means in the position wherein the narrow portions of said slots do surround the bolts.

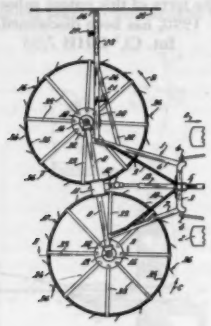
4,023,335
RAKE MACHINE

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland, and Ary van der Lely, 10, Weverskade, Maasland, Netherlands

Filed Oct. 11, 1974, Ser. No. 514,308
Claims priority, application Netherlands, Oct. 12, 1973, 7314028; Feb. 18, 1974, 7402172
Int. Cl.² A01D 79/02
U.S. Cl. 56—370 30 Claims

1. A machine for raking and displacing crop lying on the ground comprising a frame and at least one rake member supported by said frame, said rake member being rotatable about an upwardly extending axis and driving means connected to rotate said member, said member comprising a rotatable support with crop engaging means attached around

the axis of rotation of said support, said crop engaging means being moved through a generally circular path during rotational operation of said member, said crop engaging means being displaceable and turnable on said support during rotation thereof, responsive to the influence of control means, said control means being fixed to said member adjacent and within the perimeter of said support and positioned to turn the crop engaging means sequentially and deposit crop therefrom during rotation of the rake member.



4,023,336

YARN RESERVE FORMING AND MOVING APPARATUS

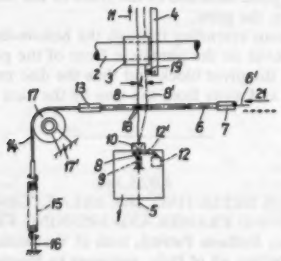
Peter Krusche, Bremen, and Dieter Twillmann, Bremen-Farge, both of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed June 4, 1975, Ser. No. 583,765

Claims priority, application Germany, June 26, 1974, 2430544

Int. Cl.² D01H 1/12

U.S. Cl. 57—34 R 15 Claims



1. In apparatus for forming a yarn reserve and for moving yarn back and forth in open-end spinning devices of the type having at least one spinning turbine, a yarn discharge opening, a pair of delivery rollers opposite said opening, a yarn guide rod having guide elements and disposed downstream of the opening in the direction of yarn movement, the yarn guide rod being displaceable in a direction transverse to the axis between the opening and the delivery rollers and defining deflection means for diverting the yarn from said axis, the improvement comprising means moved in only one direction of rotation for driving the yarn guide rod and in interruptable connection therewith for moving the guide rod back and forth between normal and deflected positions and for moving the guide rod to a further position for providing a yarn reserve.

4,023,337

DEVICE FOR DISTRIBUTING SOFTENING LIQUID ON THE YARN DURING THE TWISTING PROCESS

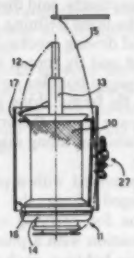
Claudio Speranzin, Pordenone, Italy, assignor to Officine Savio, S.p.A., Udine, Italy

Filed Dec. 11, 1975, Ser. No. 639,979

Claims priority, application Italy, Dec. 11, 1974, 83447/74

Int. Cl.² D01H 13/30, 7/86

U.S. Cl. 57—35 14 Claims



1. A device for distributing softening liquid to a yarn, during the process of balloon twisting the yarn, after the yarn has emerged from a spindle or from a core of the spindle, comprising a container, at least one feeder means for feeding liquid, at least one chamber integrally fixed to an external portion of said container and a coordinated set of seepage holes present in the surface of said container, communicating the inner surface of said container with said chamber, wherein said chamber is supplied with liquid under adjustable pressure.

4,023,338

METHOD AND APPARATUS FOR DOFFING FULL PACKAGED BOBBINS IN A FLY FRAME

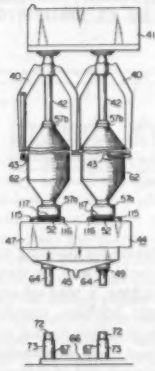
Takuzo Tooka; Hidejiro Araki, both of Toyoake; Mitsuo Mori, Toyota; Katumi Nakane, Okazaki, and Toshio Morishita, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Sept. 29, 1975, Ser. No. 617,813

Claims priority, application Japan, Oct. 3, 1974, 49-114196

Int. Cl.² D01H 9/08

U.S. Cl. 57—52 19 Claims



1. In a method for doffing full yarn packages from a fly frame provided with a plurality of twisting and winding units arranged along the longitudinal direction of said fly frame, a plurality of bobbin driving mechanisms for driving a bobbin mounted on each corresponding twisting and winding unit and means for supporting said bobbin driving mechanisms, a

method for doffing full yarn packages from said fly frame comprising,

relatively displacing the bobbins containing said full yarn packages and said bobbin driving mechanisms along an axial direction of each bobbin so that said bobbins are disengaged from said bobbin driving mechanisms and are located above said bobbin driving mechanisms, respectively, after completion of forming full yarn packages on said respective bobbins engaged with said bobbin driving mechanisms, respectively, said disengaged bobbins above said driving mechanisms defining a conveying passage in a space above said driving mechanisms along said longitudinal direction of said fly frame, and

carrying said disengaged bobbins containing full yarn packages out of said fly frame along said conveying passage formed in said space above the arrangement of said bobbin driving mechanisms, along said longitudinal direction of said fly frame.

7. In a fly frame provided with a plurality of twisting and winding units arranged along the longitudinal direction thereof, an apparatus for carrying out doffing operations, comprising in combination with a plurality of bobbin driving mechanisms for driving bobbins, each of which is mounted on a corresponding twisting and winding unit, and means for supporting said bobbin driving mechanisms, means for supporting said bobbins containing a full yarn package in disengaged condition from the corresponding bobbin driving mechanism at the time of carrying out said doffing operation and means for carrying said bobbins supported by said supporting means along a conveying passage formed in a space above the arrangement of said bobbin driving mechanism along said longitudinal direction of said fly frame.

4,023,339

AUTOMATIC LOADING, UNLOADING AND TRANSFER DEVICE ON SPINNING MACHINES

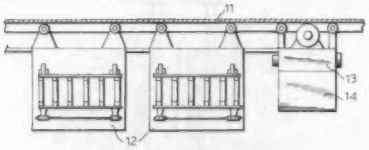
Paul Laderach; Charles Michalet, both of Lyon, and Jean Rigaud, Ecully, all of France, assignors to Rhone-Poulenc-Textile, Paris, France

Filed Aug. 6, 1974, Ser. No. 495,243

Claims priority, application France, Aug. 8, 1973, 73.29102

Int. Cl.² D01H 9/10

U.S. Cl. 57—53 **23 Claims**



1. An automatic device for donning and doffing bobbins on at least one textile machine and for transporting said bobbins between a textile machine, a take-up area of full bobbins and a feed area of empty bobbins, comprising a guide circuit connecting the textile machine to said take-up area and to said feed area, and at least two independent means capable of traveling along the circuit and of stopping one after the other in front of the textile machine, the first means being fitted with a gripping means for simultaneous gripping of several bobbins and for the removal of said bobbins from the textile machine and for placing them on the take-up area, the second means being fitted with a gripping means for simultaneously gripping several empty bobbins from the feed area and positioning them on the textile machine.

4,023,340

RING DRIVE CLUTCH LEVER

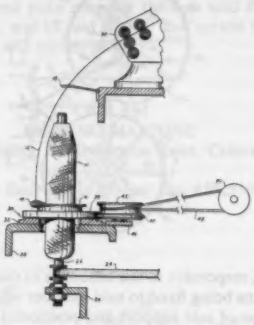
Manuel Costales, and Moustafa I. Hakki, both of P.O. Box 884, Belmont, N.C. 28012

Filed June 23, 1975, Ser. No. 589,390

The portion of the term of this patent subsequent to June 12, 1990, has been disclaimed.

Int. Cl.² D01H 7/58

U.S. Cl. 57—75 **7 Claims**



1. In a machine having

a. bobbins,

b. bobbin drive means on the machine for rotating the bobbins at high speed,

c. a light weight base around each bobbin,

d. a ring on the base around each bobbin,

e. each ring mounted for rotation on its base,

f. a traveler on each ring,

g. means for feeding yarn to each bobbin via the traveler,

h. a disc mounted for rotation,

j. an elastic belt around the disc for rotating same, and

k. a friction band on the disc contacting the ring;

m. the improved structure for moving each of the discs toward and away from the ring comprising:

n. a pivot block pivoted to the base,

p. a pitman extending from behind the pivot block to in front of the base,

q. a steel plate attached to the front of the base,

r. a hole in the plate,

s. the pitman extending through the hole in the plate,

t. a cam lever on the pitman in front of the plate,

u. so that the pivot block and thus the disc may be moved toward and away from the ring by the cam lever.

4,023,341

DEVICE FOR DETECTING THE BREAKAGE OF YARN IN DRAWING FRAMES AND SPINNING FRAMES

Emilio Saino; Raffaele Patritti, both of Verbania, and Giorgio Toscani, Milan, all of Italy, assignors to Montefibre, S.p.A., Milan, Italy

Filed Feb. 10, 1975, Ser. No. 548,790

Claims priority, application Italy, Feb. 11, 1974, 20382/74

Int. Cl.² D01H 13/16

U.S. Cl. 57—81 **1 Claim**

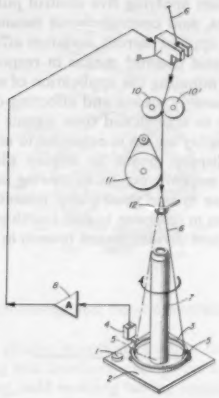
1. In combination with a textile machine having a ring support, yarn feeding cylinders and a yarn cutting device positioned upstream of said yarn feeding cylinders, a device for detecting yarn breaks in drawing and spinning frames comprising:

a permanent magnet attached to said ring support,

a traveler made at least partially of a ferromagnetic material positioned adjacent said permanent magnet, said traveler being rotated by the winding of said yarn and slightly magnetized by said permanent magnet,

an electromagnetic impulse detector having a coil wound on a ferromagnetic core attached to said ring support adjacent said traveler, a voltage being induced in said coil by said magnetized traveler as it is moved past said detector, and

an amplifier coupling said electromagnetic impulse detector



to said yarn cutting device, operation of said yarn cutting device being prevented when said impulse detector receives pulses as a result of the movement of said magnetized traveler by said yarn, and said yarn cutting device being actuated to cut said yarn when a break in the yarn causes said traveler to stop moving and pulses are no longer received by said impulse detector.

4,023,342

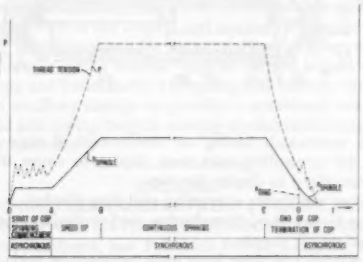
RING SPINNING OR TWISTING PROCESS

Erwin Schenkel, Weinbergstrasse 19, 7412 Eningen, Germany

Filed May 16, 1975, Ser. No. 578,218

Int. Cl.² D01H *1/20, 7/56*

U.S. Cl. 57—156 **27 Claims**



1. A process for controlling the rotational speed of a spinning or twisting ring of a spinning or twisting machine during a spinning or twisting operation, the machine including: a spinning or twisting ring; a traveler mounted on the ring; a rotatably drivable spindle passing through the ring, the spindle being rotatably driven from a rest state to an operating speed thus corresponding to a first and second phase of operation and from the operating speed back to the rest state thus corresponding to a third and fourth phase of operation; and a sleeve disposed on the spindle, the traveler being adapted during spindle rotation to draw the thread producing a tension therein and cause it to be wound on the sleeve and in the process of drawing the thread the traveler drives the ring, the process including the steps of:

a. increasing the rotational speed of the spindle up to its operating speed such that the traveler rotates relative to the ring during the first phase of operation thereby causing the ring to accelerate, and the traveler rotates in synchronism with the ring during the second phase of operation with both the traveler and ring being accelerated;

b. reducing th rotational speed of the spindle from its operating speed during the third phase of operation such that the traveler and ring continue to rotate in synchronism with the ring deceleration being such that the tension in the thread is retained at an adequate level to prevent rupture thereof; and

c. reducing the rotational speed of the spindle to zero during the fourth phase of operation such that the traveler rotates relative to the ring with the ring decelerating faster than the traveler and with the ring being brought to rest prior to the traveler.

4,023,343

ELECTRONIC CLOCK WITH CAPACITATIVE RESETTING

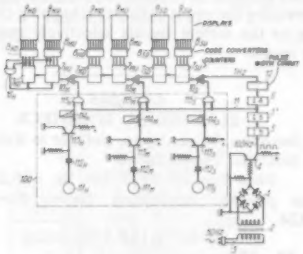
René G. Martinet, 81 Avenue Bosquet, Paris, France (75007)

Filed Apr. 23, 1976, Ser. No. 679,863

Claims priority, application France, Apr. 25, 1975, 75.13056

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 R **5 Claims**



1. An electronic clock comprising a decade seconds counter, a sexenary tens-of-seconds counter, a decade minutes counter, a sexenary tens-of-minutes counter, an hours counter and a tens-of-hours counter, all the counters being cascade-connected and, except for the seconds counter, receiving as stepping-on pulses the carry pulses of the previous counter, means for deriving from a frequency source timing pulses at a repetition frequency higher than 1 Hz, a frequency-divider chain receiving the timing pulses and supplying resetting pulses at a lower frequency than said frequency source and the seconds counter coupled to said frequency divider chain to receive pulses at the frequency of 1 Hz, capacitative resetting control keys, transistors having input circuits respectively containing capacitative resetting keys and output circuits, resettable monostable circuits in the output circuits of said transistors, AND-gates receiving the resetting pulses and the output signals of said resettable monostable circuits and OR-gates disposed between the counters and receving the stepping-on pulses of the counter and the output pulses of the AND-gates.

4,023,344
AUTOMATICALLY CORRECTED ELECTRONIC TIMEPIECE

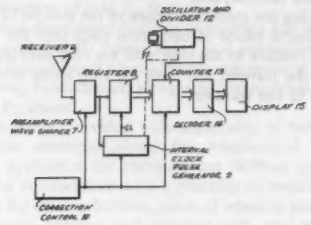
Fumiaki Mukaiyama, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Sept. 3, 1975, Ser. No. 610,022

Claims priority, application Japan, Sept. 3, 1975, 50-101248

Int. Cl.² G04B 1/00

U.S. Cl. 58—35 W **17 Claims**



1. An electronic timepiece assembly for automatically correcting the time display of a digital display electronic timepiece comprising in combination a first time standard electronic timepiece for accurately counting present time, said time standard electronic timepiece including transmitter means for selectively transmitting setting signals representative of the present time count of said time standard timepiece, and a further digital display electronic timepiece including timekeeping circuit means for producing timekeeping signals representative of the count thereof and digital display means for displaying time in response to said timekeeping signals, said further electronic timepiece further including receiver means for selectively receiving the setting signals representative of the count of present time transmitted by said time standard electronic timepiece transmitter means, and correction means coupled to the timekeeping means for automatically correcting the count of said timekeeping circuit means in response to the setting signals selectively received by said receiver means.

4,023,345
ELECTRONIC TIMEPIECE

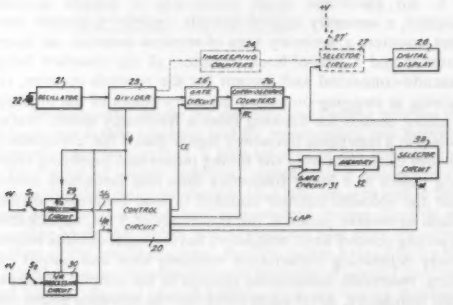
Youichi Imamura, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,022

Claims priority, application Japan, Nov. 25, 1974, 49-135324

Int. Cl.² G10F 8/00, 10/00

U.S. Cl. 58—39.5 **10 Claims**



1. In an electronic timepiece wristwatch including counter means for producing elapsed time signals, memory means for selectively storing said elapsed time signals, and display means for selectively displaying one of elapsed time and stored time in response to one of said elapsed time signals produced by said counter means and said stored time signals stored in said memory means being respectively applied thereto, the improvement comprising control circuit means coupled to said counter means, memory means and display means, manually actuatable means coupled to said control circuit means for selectively seriatum applying five control pulses to said control circuit means, said control circuit means in response to said pulses being applied thereto, seriatum affecting, a starting of the count of said counter means in response to said first control pulse, terminating the application of said elapsed time signals to said memory means and effecting display of stored time in response to said stored time signals in said memory means by said display means in response to said second pulse, returning said display means to display said elapsed time signals and said memory means to storing said elapsed time signals in response to said third pulse, inhibiting the count of said divider means in response to said fourth pulse, and adjusting the count of said divider means to zero in response to said fifth pulse.

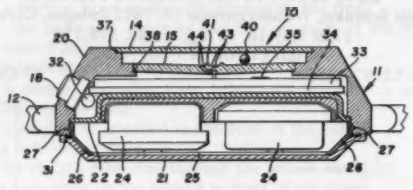
4,023,346
WRIST WATCH WITH TIME DISPLAY CONTROL SWITCH

William M. Kayser, 6408 - 81st Ave. North, Minneapolis, Minn. 55445

Filed Apr. 1, 1976, Ser. No. 672,793

Int. Cl.² G04B 19/34

U.S. Cl. 58—50 R **10 Claims**



1. A wristwatch having an electro-optical time display, means for controlling said time display to cause the latter when energized to display the time,

a power supply for energizing said time display,

a case housing said time display, said controlling means and said power supply,

space inner and outer front walls mounted on said case over said time display,

and a switch having a pair of contacts secured adjacent said inner wall and which are connected to said power supply and said time display, and a movable member disposed between said inner and outer walls and movable into and out of a cooperative relationship with said contacts and effective to cause said contacts to cause energization of said time display when said movable member is in a predetermined position on said inner front wall,

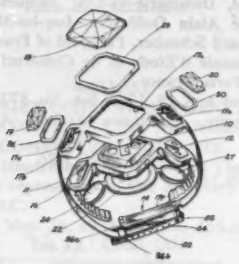
said inner front wall being transparent over at least the portion thereof overlying said time display,

and said outer front wall being transparent over at least the portions overlying said time display and the possible area of movement of said movable member so that the wearer can not only read the time indicated by said optical display but can also be aware of the position of said movable member with respect to said predetermined position.

4,023,347
WRISTWATCH CASING AND BAND CONSTRUCTION

Terry M. Haber, 3050 S. Bristol, No. 8C, Santa Ana, Calif. 92707

Filed Oct. 17, 1975, Ser. No. 623,352
Int. Cl.² G04B 37/00
U.S. Cl. 58—88 R 5 Claims



1. A wristwatch casing and band construction comprising, in combination:

a. an integral plastic injection molding defining a central watch casing and auxiliary casings on either side of the central casing, said molding having opposite ends extending outwardly from the auxiliary casings and circling around towards each other to terminate in spaced relationship to define a wristband integral with the watch casing;

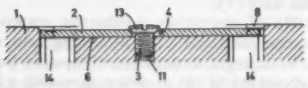
b. an integral metallic stamping in the form of a strip having a central opening and auxiliary openings positioned to overlie said injection molding in registration with said central casing and auxiliary casings respectively, said strip further including oppositely directed integral spring tongues extending into the auxiliary openings from diametrically opposite peripheral portions of the strip defining the central opening, the opposite ends of said strip extending outwardly from said auxiliary openings and circling around on the exterior of said molding to terminate in a clasp structure between the spaced ends of said injection molding; and,

c. center and auxiliary lens elements individually receivable respectively in the central and auxiliary openings of said strip to define covers for the central and auxiliary casings, whereby a watch module may be carried in said central casing and batteries for energizing said module carried in said auxiliary casings to provide a combined watch and band said spring tongues serving as electrical contacts for said batteries.

4,023,348
POSITIONING ARRANGEMENT ON A FRAME MEMBER AND ON A PART HAVING TO BE SECURED THERETO

Urs Giger, Solothurn, and Friedrich Perrot, Lengnau, both of Switzerland, assignors to ETA A.G. Ebauches-Fabrik, Switzerland

Filed Aug. 19, 1975, Ser. No. 605,836
Claims priority, application Switzerland, Aug. 19, 1974, 11292/74
Int. Cl.² G04B 29/02; B23P 13/00
U.S. Cl. 58—52 R 5 Claims

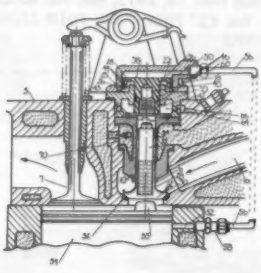


1. A positioning arrangement on a frame member and on a part to be secured thereto, comprising a plane supporting face on the frame member to receive said part laid thereon, a securing means removably anchored to said frame member and having an axis perpendicular to said plane supporting face and along which said securing means is movable relative to said frame member, an opening in said part for the passage therethrough of said securing means, said opening having an edge engageable by said securing means at a point located on a predetermined radius of the securing means, a conical surface on one of the securing means and the edge of the opening in the part at the point located on said predetermined radius, said conical surface being inclined in such manner that the securing means, upon moving along its axis toward said frame member, exerts a thrust on said part urging the same in the direction of said predetermined radius relative to said frame member, holding means on said frame member preventing said part from sliding on said plane supporting face under the action of the thrust exerted thereon by said securing means, said holding means comprising three abutting surface portions on said frame member, said part comprising three surface portions, each surface portion of said part corresponding to one of said abutting surface portions of the frame member, each one of said three surface portions of said part abuttingly engaging the corresponding abutting surface portion of the frame member under the action of the thrust of said securing means when said part is secured to said frame member, said abutting surface portions of the frame member being arranged in such manner that every two of them constitute a guide-way along which said part may move under the action of the thrust of said securing means, the two surface portions of said part, corresponding to the two of the abutting surface portions of the frame member, sliding on said two abutting surface portions of the frame member until the third one of said surface portions of said part butts against the third one of said abutting surface portions of the frame member.

4,023,349
VALVE ARRANGEMENTS FOR RECIPROCATING PISTON MACHINES

Glenn B. Warren, 1361 Myron St., Schenectady, N.Y. 12309

Filed Nov. 17, 1975, Ser. No. 632,314
Int. Cl.² F02G 3/02
U.S. Cl. 60—39.6 14 Claims



1. The combination with a reciprocating piston machine of valve means for controlling the flow of fluid from an inlet passage to a cylinder having a working piston reciprocally disposed therein, the combination comprising:

a. chamber having a cylindrical bore adjacent said cylinder;

b. a valve having a head adapted to contact a valve seat associated with said inlet passage adjacent said cylinder and a stem extending from said valve head toward said chamber, said valve head being adapted to be moved away from said valve seat to admit fluid into said cylinder by the pressure applied to said valve stem and head as said working piston approaches top dead center;

c. a plunger carried by said valve stem and slidingly disposed within the cylindrical bore of said chamber; and

d. means effecting the closing of said valve at the desired

time, said means including porting means controlled by the position of said working piston for communicating the pressure of the fluid in said cylinder to the chamber space above said plunger at working piston positions lower than a predetermined point below top dead center, said pressure acting on the area of said plunger and providing the force to move said valve to its closed position.

5. In a reciprocating engine of the type wherein air and fuel are burned in an external combustion system and the high temperature combustion products are selectively supplied through the valve-controlled inlet passages to the respective expansion cylinders of the engine, the combination with such engine of a pneumatically actuated valve means for controlling the flow of said combustion products to the expansion cylinder comprising:

a. a valve guide extending toward the inlet passage;

b. a chamber having a cylindrical bore adjacent the outer end of said valve guide;

c. a valve having a head and a stem, said stem extending through said valve guide and into said chamber and said head adapted for engagement with a valve seat associated with said inlet passage operative when actuated into and out of engagement with said valve seat to control the flow of fluid from the inlet passage into the expansion cylinder;

d. a plunger secured on the end of said valve stem and slidingly disposed in the cylindrical bore of said chamber; and

e. means responsive to the position of said piston in said expansion cylinder for actuating said valve head into and out of engagement with said valve seat in accordance with the operating conditions of said engine, said means being operative to communicate the fluid pressure in said expansion cylinder to the chamber space above said plunger to cause said valve to be moved into engagement with said valve seat to close said inlet passage at piston positions below a predetermined point below top dead center and to terminate said communication whenever said piston is above said predetermined point.

4,023,350

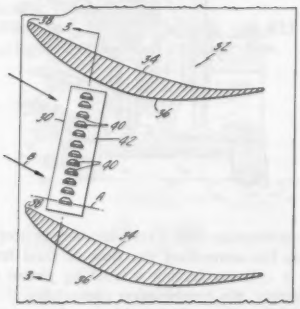
EXHAUST CASE FOR A TURBINE MACHINE

Edward John Hovan, Manchester, and Walter Ernest Bruetsch, East Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 10, 1975, Ser. No. 630,565

Int. Cl.² F02C 7/00; F01D 25/30

U.S. Cl. 60—39.5 **8 Claims**



1. Apparatus for reducing the secondary flow of working medium gases circumferentially between the struts of a turbine exhaust case having an outer cylindrical member and an inner cylindrical member which conjunctively form a flow path for the working medium gases therebetween, including a plurality of vortex generators extending from a single strip of metal material radially outward from the inner cylindrical member into the flow path for the medium gases between each pair of adjacent struts to intercept an axially flowing portion of said gases and direct said axially flowing portion into the flow boundary layer adjacent the inner cylindrical member to inhibit the flow of secondary gases by reducing the thickness of the boundary layer.

4,023,351

INJECTING AND IGNITING DEVICE

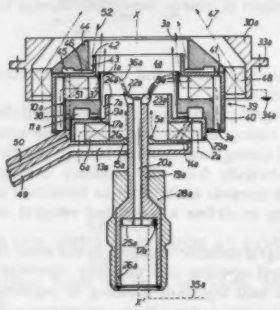
Roland Robert Charles Beyler, Levallois-Perret; Jacques Emile Jules Caruel, Dammarie-les-Lys; Jacques Eloi Pidebois, Paris; Hervé Alain Quillevere, Issy-les-Moulineaux, and Michel Bernard Schenher, Paris, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed Apr. 29, 1975, Ser. No. 572,663

Claims priority, application France, Apr. 30, 1974, 74.14939

Int. Cl.² F02C 7/26

U.S. Cl. 60—39.74 B **3 Claims**



1. A device for injecting ignited fuel into an airflow, comprising the combination of:

a jacket (10) of electrically conductive material, with a generally cylindrical inner surface having its axis (XX') generally parallel to the airflow direction,

a generally cylindrical shield (9) of electrically conductive material structurally and electrically united to said jacket (10), and extending coaxially with and over a substantially smaller axial extent than said jacket cylindrical inner surface, said shield being spaced internally of an upstream section only of said cylindrical inner surface and ending with a free and short of a downstream section thereof to thereby leave said downstream section unshielded and inwardly exposed, whereby said shield (9) defines with said jacket (10) both a stepped tubular duct (4, 23) and an annular duct (7) bounded by said shield and said upstream section of said inner surface,

closure means (5) fitted at the upstream end of said tubular duct (4) to bottom the same,

a centripetal air swirler (6) leading into said tubular duct (4) and fitted upstream of said shield (9),

means (29) tapping air from said airflow to feed said centripetal air swirler (6) thereby producing an inner whirl of air (2) through said stepped tubular duct (4, 23) towards the downstream end of said jacket (10),

means (8) for producing an outer whirl of air (3) around said jacket (10) towards the downstream end of said jacket (10),

duct means (18, 17, 14, 11, 12) for supplying fuel to said annular duct (7),

a rod (20) of electrically conductive material having a flared operative end (22) projecting into said tubular duct (4) adjacent to but inwardly spaced from said free end of said shield (9) to define therewith a first annular spark gap (24) and further with said unshielded downstream section of said jacket (10) a second annular spark gap (36) which overrides said first annular spark gap (24),

means (19) for electrically insulating said electrically conductive rod (20) with respect to said electrically conductive jacket-and-shield assembly (10-9), and

means (35) for applying a spark generating voltage across said first and second annular spark gaps (24, 36).

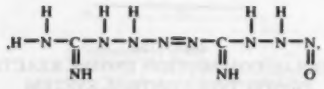
4,023,352

HIGH NITROGEN CONTENT GAS GENERANT AND METHOD OF PRODUCING NEAR-NEUTRAL COMBUSTION PRODUCTS

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 26, 1974, Ser. No. 456,571
Int. Cl.² C06D 5/04
U.S. Cl. 60—218 4 Claims

1. A gas generant that is decomposable by a reaction initiated by contacting said gas generant with inhibited red fuming nitric acid to yield near-neutral combustion products comprised substantially of nitrogen and carbon, said gas generant consisting of tetracene



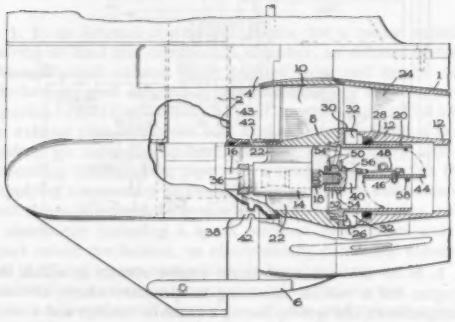
that is in a pelletized form prepared by dead pressing at 10,000–30,000 psia.

4,023,353

MULTI-FLOW MARINE JET-PROPULSION APPARATUS

Kimball P. Hall, 716 Kingston Road, Princeton, N.J. 08540

Filed Dec. 3, 1975, Ser. No. 637,398
Int. Cl.² B63H 1/28
U.S. Cl. 60—221 10 Claims



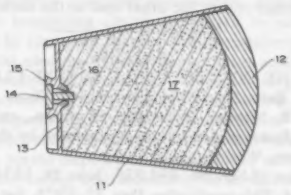
1. Marine propulsion apparatus comprising a stator tube, a rotor having a rotor tube, said tubes being in axial alignment, and means mounting said rotor tube in axially displaceable relation with respect to said stator tube, said tubes having interengaging parts co-acting to form a variable-volume chamber for entrapping fluid and thereby controlling the axial rotor speed during displacement.

4,023,354

SLURRIED PROPELLANT ROCKET MOTOR

Ronald F. Vetter; James P. Diebold, both of Ridgecrest; George F. Sieg, China Lake; Howard W. Gerrish, Jr., China Lake; Howard H. Payne, China Lake; Elmer J. Rhyn, China Lake, and Irvin F. Witcosky, Ridgecrest, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 18, 1971, Ser. No. 200,247
Int. Cl.² F02K 9/00
U.S. Cl. 60—252 3 Claims



1. A spinning rocket motor adapted to be expelled from a gun which comprises:

a. a cylinder having a forward end and a rear end;

b. a forward plate closing the forward end of said cylinder;

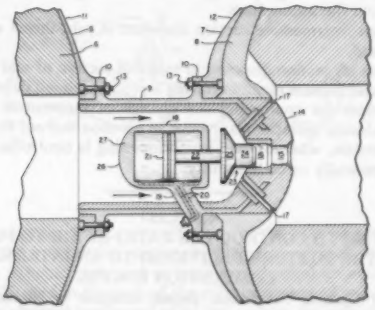
c. a base plate having an exhaust port therethrough forming a rear wall of the cylinder, said base plate having a cross sectional thickness such that it bows inwardly and acts in a diaphragm-like manner in transferring forward momentum through propellant in said motor to said forward plate when said motor is fired from a gun.

4,023,355

COMBINATION DIFFUSER, THERMAL BARRIER, AND INTERCHAMBER VALVE FOR ROCKETS

Allan J. McDonald, Brigham City, Utah, assignor to Thiokol Corporation, Newtown, Pa.

Filed Feb. 24, 1972, Ser. No. 228,935
Int. Cl. F02k 9/04
U.S. Cl. 60—254 5 Claims



1. A combined diffuser, thermal barrier, and interchamber valve for metering gases as desired from a gas generator, having an apertured aft closure, into a solid propellant rocket motor, having an apertured forward closure, comprising:

a pipe having one closed end with a central orifice and a plurality of canted, radially-oriented orifices in the closed end, the orifices also being equipped with valve seats on their inlet ends;

a double acting, hydraulic actuator positioned centrally in the pipe and having a piston with an actuation arm attached thereto;

a support member fixed at one end to the actuator and at the other end to the pipe;

a compound poppet valve member fixed to the actuating arm of the actuator, comprising a first valve member that fits into the valve seat of the central orifice of the pipe and a second valve member that may open and close the radial orifices, the first valve member being somewhat elongated so that, as the poppet valve member is moved aftward, the central orifice will be closed first and so that the radial orifices will be opened first as it is moved forward; and

means on the pipe for attaching it at one end to the gas generator and at the other end to the rocket motor.

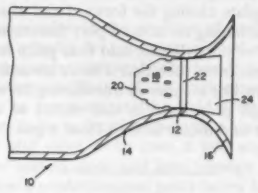
4,023,356
NOISE CONTROLLABLE NOZZLE CLOSURE

Robert E. Betts, Huntsville; Lawrence B. Thorn, Madison, and Albert R. Maykut, Huntsville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 484,035, June 28, 1974, Pat. No. 3,968,646. This application Dec. 22, 1975, Ser. No. 643,428

Int. Cl.² F02K *9/00*

U.S. Cl. 60—271 **2 Claims**



1. In a rocket motor having a nozzle including an entrance section a throat section and an exit section, closure means for controlling the opening of said nozzle responsive to ignition of said rocket motor comprising:

a. a forward section disposed in said entrance section of said nozzle;

said forward portion being provided with a hollow configuration having openings communicating into said motor and the atmosphere

b. an intermediate section disposed in said throat section; and,

c. an aft section disposed in said exit section of said nozzle,

d. said closure member having a predetermined density and mass for controlling the change of momentum of the closure member responsive to ejection thereof from said nozzle, whereby said nozzle opening is controlled incrementally or continuously.

4,023,357
SYSTEM TO CONTROL THE RATIO OF AIR TO FUEL OF THE MIXTURE DELIVERED TO AN INTERNAL COMBUSTION ENGINE

Kenji Masaki, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 22, 1975, Ser. No. 643,127

Claims priority, application Japan, Dec. 24, 1974, 50-1420

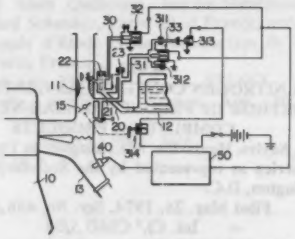
Int. Cl.² F01N *3/15;* **F02B** *33/00*

U.S. Cl. 60—276 **6 Claims**

1. System to control ratio of air to fuel of air/fuel mixture being delivered to an internal combustion engine having an intake passage, an exhaust passage and a carburetor forming part of the intake passage, said carburetor having a throttle valve in the intake passage and a fuel delivery passage with a slow fuel passage for use in an engine idle condition, comprising

means sensing in the exhaust gases in the exhaust passage, the concentration of a component which is variable in dependence on the ratio of air to fuel of the mixture and producing an electric signal representative of the sensed concentration of the component in the exhaust gases,

passage means to conduct additional air into the slow fuel passage, said passage means having a first air inlet and a second air inlet disposed parallelly with the first air inlet



and having an effective diameter which is substantially smaller than that of said first air inlet,

electromagnetic means controlling the rate of air through the passage means in accordance with said electric signal, and

means limiting the rate of air through said first air inlet in response to engine idling.

4,023,358
INTERNAL COMBUSTION ENGINE REACTOR PROTECTIVE CONTROL SYSTEM

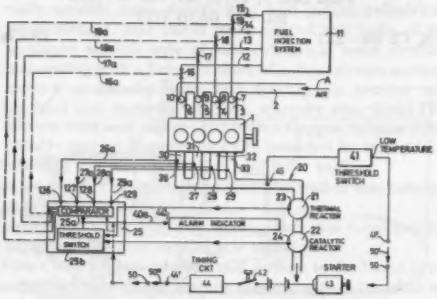
Helmut Maurer, Schwieldingen, and Karl Heinz Keerl, Bissingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Apr. 8, 1974, Ser. No. 458,777

Claims priority, application Germany, Apr. 18, 1973, 2319576

Int. Cl.³ F02B *75/10*

U.S. Cl. 60—277 **8 Claims**



1. In an internal combustion engine system in which the engine has a normal operating temperature above ambient temperature, the system having a catalytic reactor and a reactor protective system including

engine operation sensing means (26–29) located in sensing relation to at least two of the cylinders of the engine and sensing a characteristic of a combustion event in the respective cylinder to monitor combustion of fuel and air supplied thereto, and providing a combustion monitor signal upon detection of conditions indicative of failure of combustion in a respective cylinder; and

interrupting means (16–19; 25) controlled by said monitor signal interrupting supply of combustible mixture of air

and fuel to the respective cylinder to protect the reactor against entry of uncombusted mixture thereinto,

the improvement comprising

a low-temperature sensor means (45, 23, 24; 26–29) providing an override signal to said interrupting means (16–19; 25) to disable said interrupting means when the sensed temperature is below normal engine operating temperature level at which the exhaust gases have a predetermined temperature sufficient for detoxification in the catalytic reactor, the sensor being in temperature sensing relation with a component of the engine system and providing an output signal (41') when the temperature of the component is below said normal level, to disable said interrupting means and permit application of combustible air-fuel mixture to the engine regardless of presence of a combustion monitor signal indicative of failure of combustion.

4,023,359
ELECTRONICALLY CONTROLLED EXHAUST GAS PURIFYING SYSTEM

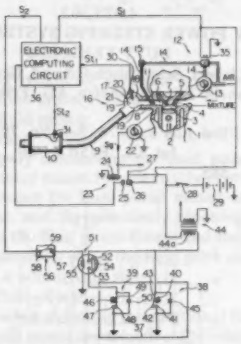
Kenji Masaki, Yokohama; Yasuo Nakajima, and Hiroyuki Maruoka, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation-in-part of Ser. No. 379,938, July 17, 1973, abandoned. This application May 6, 1975, Ser. No. 574,960

Claims priority, application Japan, July 19, 1972, 47-72264; July 19, 1972, 47-72265

Int. Cl.² F01N *3/00*; F02B *75/10*

U.S. Cl. 60—277 **10 Claims**



1. In an internal combustion engine for a motor vehicle having at least one combustion chamber, an exhaust system through which exhaust gases emitted from said engine are discharged, said exhaust system including an exhaust port opening to said combustion chamber, an exhaust manifold and an exhaust pipe connected with said exhaust manifold, a secondary air supplying system including an air pump and a secondary air supplying pipe with a oneway check valve for supplying a secondary air from said air pump into said exhaust port through a nozzle, a generator driven by said engine, and a distributor including a spark advance mechanism and a spark retard mechanism, an electronically controlled exhaust gas purifying system comprising, in combination:

a catalytic converter mounted in said exhaust pipe;

an auxiliary thermal reactor mounted in said exhaust manifold and located upstream of said catalytic converter for primarily re-combusting unconsumed noxious compounds contained in said exhaust gases to the extent that the residual unconsumed noxious compounds contained in exhaust gases discharged from said thermal reactor are acceptable to said catalytic converter; and

an electronic control means for electronically controlling said secondary air supply system to prevent said secondary air from being supplied into said exhaust port under at least one of the following conditions, one being that at least one of the temperatures of said thermal reactor and said catalytic converter is above a critical value at which said thermal reactor and said catalytic converter would be destroyed, the other being that said engine is under cranking operation,

said electronic control means comprises an electric power source; first temperature detection means mounted on said thermal reactor for detecting the temperature of said thermal reactor to produce an electric thermal reactor temperature analog signal; second temperature detection means mounted on said catalytic converter for detecting the temperature of said catalytic converter to produce an electric catalytic converter temperature analog signal; electronic computing circuit connected to said power source to be energized thereby and responsive to at least one of said electric thermal temperature analog signal and said catalytic converter temperature analog signal to produce a first electric operating signal when at least one of the temperatures of said thermal reactor and said catalytic converter rises above said critical value; three-way valve means disposed in said seconday air supplying pipe for preventing said secondary air in said secondary air supplying pipe from being supplied into said exhaust port to feed said secondary air back into said air pump; electric actuating means for actuating said three-way valve means when said actuating means is energized; and electric change-over switch means for disconnecting said electronic computing circuit with said power source and connecting said actuating means with said power source to actuate said three-way valve means by means of said power source when said engine is under cranking operation.

4,023,360
APPARATUS FOR THE DETOXIFICATION OF EXHAUST GASES IN INTERNAL COMBUSTION ENGINES

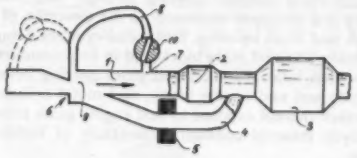
Günter Wössner, Esslingen; Josef Zweng, Warmbronn, and Ernst Linder, Muhlacker, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 22, 1974, Ser. No. 517,020

Claims priority, application Germany, Oct. 23, 1973, 2352965

Int. Cl.² F01N *3/15*

U.S. Cl. 60—277 **2 Claims**



1. In an apparatus for detoxification of the exhaust gases of an internal combustion engine, including an exhaust system with an exhaust pipe and at least one thermal or catalytic reactor located in the path of the exhaust gases and including a bypass channel connected at its two ends to the exhaust gas pipe so that exhaust gases may be diverted to prevent overheating the reactor, the improvement comprising:

means defining a branchoff location of the exhaust pipe to which one end of the bypass channel is connected thereby maintaining a continuous communication of the bypass channel with the exhaust gas flow at the branchoff location;

cooling means, attached to said bypass channel for cooling the exhaust gases flowing through said bypass channel;

means providing that said bypass channel is rejoined at its other end with the exhaust pipe upstream of said reactor; and

a fluid flow control system including at least one control line channel connected at one end to the exhaust pipe in the region of said branchoff location and at its other end to the exhaust pipe downstream of said branchoff location and a cross section adjustment means contained within said control line channel so that said control line channel is in continuous communication with the flow of exhaust gas in the exhaust pipe; whereby conditions within said control line channel serve to effect fluidic control over the exhaust gas flowing in the region of said branchoff location in the exhaust pipe and as a result can divert at least part of the exhaust gas stream in the exhaust pipe into the bypass channel whenever a predetermined mass flow rate of the exhaust gas in the exhaust pipe is reached, achieving thereby an oscillation of this exhaust gas stream between the exhaust pipe and the bypass channel.

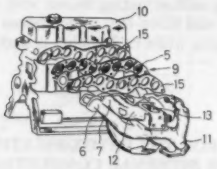
4,023,361
CATALYST FOR CONTROLLING POISONOUS EXHAUST GAS

Toshihiko Kojima, 17-1, Higashikawashimacho, Hodogaya, Yokohama, Japan

Continuation-in-part of Ser. No. 292,551, Sept. 27, 1972, abandoned. This application Aug. 2, 1974, Ser. No. 494,049

Int. Cl.² F01N *3/15*; **F02M** *25/06*

U.S. Cl. 60—302 **4 Claims**



1. A catalytic converting device comprising a body block adapted to be inserted between an engine block and the intake and exhaust manifolds which are normally directly attached to said engine block, said body block having at least one opening extending therethrough in alignment with corresponding passageways in said engine and manifold respectively to permit normal passage of engine gas therethrough, and at least one threaded metal cylinder passing through said body block opening in a direction transverse to the direction of gas flow through said block opening, said metal cylinder being threadedly secured to said body block and in heat conducting relation to both intake and exhaust gases passing between said manifolds and said engine block, said metal cylinder having the surface thereof exposed to said engine gases composed of a catalytic material consisting essentially of highly purified copper.

4,023,362
CONTROLLABLE-FILLING HYDRODYNAMIC FLUID COUPLING

Thomas Rögner, and Klaus Sauka, both of Crailsheim, Germany, assignors to Voith Turbo KG, Crailsheim, Germany

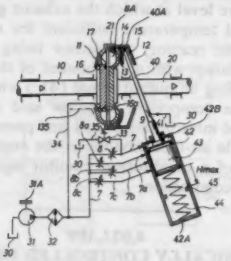
Filed June 22, 1976, Ser. No. 698,736

Claims priority, application Germany, June 27, 1975, 2528747

Int. Cl.² F16D *33/06*

U.S. Cl. 60—347 **12 Claims**

1. In a hydrodynamic torque-transmitting fluid coupling wherein a runner is rotatable relative to an impeller and defines therewith a toroidal working circuit for a working liquid, wherein the torque which is transmitted at any degree of filling of said circuit with working liquid decreases continuously when the ratio of runner speed to impeller speed increases, and wherein said circuit is connected to a source of working liquid, a combination comprising means for regulating the degree of filling of said working circuit, including a device which is movable between a "circuit empty" first position and a "circuit full" second position by moving through a plurality of intermediate positions; and means for moving said device between said first and second positions, said moving means comprising an actuator operable to move said device to and



between said positions and means for operating said actuator so as to move said device at different speeds in a plurality of stages during acceleration of said runner including a first stage during which said device moves toward said second position and a first speed and a second stage during which said device moves toward said second position at a higher second speed.

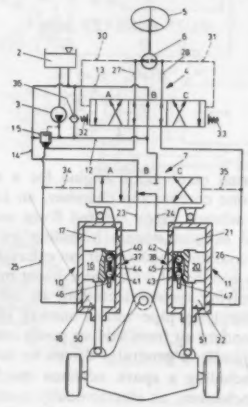
4,023,363
AUXILIARY POWER STEERING SYSTEMS FOR HEAVY DUTY VEHICLES

Karl-Heinz Liebert, Schwabisch-Gmund, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed July 6, 1976, Ser. No. 702,451

Int. Cl.² F15B *11/20*

U.S. Cl. 60—385 **10 Claims**



1. In a dual servomotor control system for power steering apparatus of the kind having a manually operable metering pump and an engine driven power pump, a pair of double acting cylinders each having a pair of pressure chambers and a respective piston intermediate said chambers;

normally closed shunt valve means carried by each piston to shunt pressure from one pressure chamber to the other of the respective cylinders through said piston when said shunt valve means is opened;

control valve means operable responsive to steering wheel rotation for effecting selective pressure and exhaust control of said pressure chambers for steering mechanism

operation wherein one pressure chamber of each cylinder is pressurized while the other is exhausted;

each shunt valve means having actuating means operative to effect opening of the respective shunt valve means toward the end of travel of the respective piston to reduce subsequent power pump pressure force acting thereon by shunting high pressure in one pressure chamber to low pressure in the other pressure chamber of the respective cylinder.

4,023,364

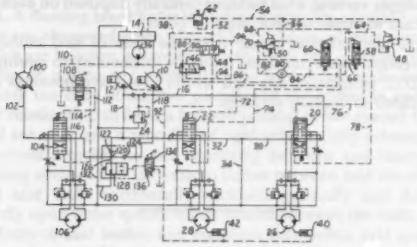
SWING FLOW SUPPLEMENTAL TRAVEL FOR AN EXCAVATOR

Donald L. Bianchetta, Coal City, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 19, 1976, Ser. No. 706,346

Int. Cl.² F15B *13/09*

U.S. Cl. 60—421 **7 Claims**



1. An actuating system for a vehicle comprising:

vehicle fluid drive motor means;

an additional fluid motor;

fluid pump means;

means operatively connecting the fluid pump means and fluid drive motor means for selectively providing communication between the fluid pump means and fluid drive motor means, and for selectively blocking communication between the fluid pump means and fluid drive motor means, to selectively place the fluid drive motor means in a driving or a non-driving state;

an additional fluid pump;

means operatively connecting the additional fluid pump and additional fluid motor for selectively providing communication between the additional fluid pump and additional fluid motor, and for selectively blocking communication between the additional fluid pump and additional fluid motor, to selectively place the additional fluid motor in a driving or a non-driving state; and

means for providing that, only with communication between the additional fluid pump and additional fluid motor being blocked by the means operatively connecting the additional fluid pump and additional fluid motor, fluid from the additional fluid pump may be selectively directed to the drive motor means.

4,023,365

COMBUSTION ENGINE WITH PRESSURE FILLING BY THE THRUST SYSTEM

Johannes A. J. van Ginhoven, Ankeveen, Netherlands, assignor to Stork-Werkspoor Diesel B.V., Amsterdam, Netherlands

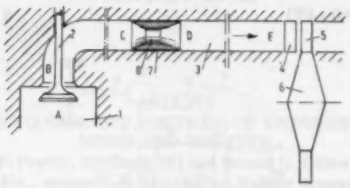
Filed Oct. 4, 1974, Ser. No. 512,020

Claims priority, application Netherlands, Oct. 9, 1973, 7313891

Int. Cl.² F02G *3/00*

U.S. Cl. 60—614 **13 Claims**

1. In combination with an internal combustion engine having at least one combustion chamber operating at high mean effective pressure and provided with an exhaust valve, a turbocharger having guide vanes and reaction vanes, and an exhaust pipe leading from said exhaust valve to said guide vanes, said exhaust pipe being of substantially uniform and predetermined cross sectional area whereby said vanes of the turbocharger normally would be subjected to pressure pulses of such high maximum pressure and short duration as inefficiently drives said turbocharger, the improvement which comprises:



restriction means disposed in said exhaust pipe for reducing said maximum pressure and significantly increasing said duration of said pressure pulses so as to increase the efficiency of driving said turbocharger.

4,023,366

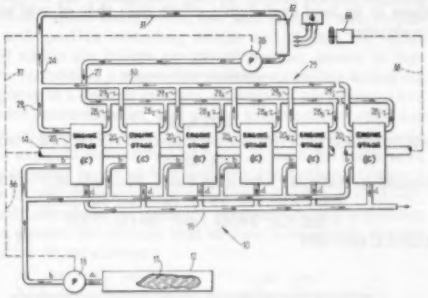
ISOTHERMAL OPEN CYCLE THERMODYNAMIC ENGINE AND METHOD

Richard N. Schneider, Reno, Nev., assignor to Cryo-Power, Inc., Reno, Nev.

Filed Sept. 26, 1975, Ser. No. 616,976

Int. Cl.² F01K *25/00*

U.S. Cl. 60—671 **26 Claims**



1. A thermodynamic engine system for providing mechanical energy from thermal potential energy comprising:

a primary working fluid path adapted to be coupled to a source of primary working fluid stored at a relatively cold temperature;

a secondary fluid path adapted to be coupled to a source of secondary fluid stored at a second higher temperature; and

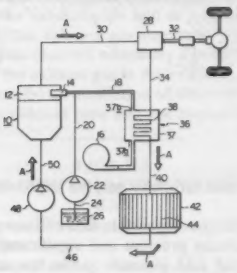
at least one engine stage comprising a heat exchanger for transferring heat from said secondary fluid to said primary working fluid, said heat exchanger having a primary working fluid inlet coupled to said primary working fluid path, a primary fluid outlet, and a secondary fluid inlet coupled to said secondary fluid path; and an expansion engine coupled to said primary working fluid outlet of said heat exchanger for generating mechanical energy from heated primary working fluid coupled thereto, said engine including means for substantially isothermally expanding said primary working fluid coupled thereto.

4,023,367

STEAM ENGINE FOR A MOTOR VEHICLE

Hisashi Izumi, Fujisawa, Japan, assignor to Nissan Motor Company Limited, Yokohama, Japan

Filed Jan. 23, 1976, Ser. No. 651,623
Claims priority, application Japan, Jan. 27, 1975, 50-11103
Int. Cl.² F01K 9/00
U.S. Cl. 60—693 4 Claims



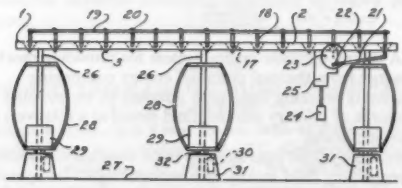
1. In a motor vehicle having a steam engine system including a steam generator with a combustion chamber into which fuel is introduced for the combustion thereof with air, an expander converting heat energy of steam from said steam generator into mechanical energy used for moving a driving shaft of said vehicle, steam cooling means cooling said steam from said expander so that said steam from said expander is finally condensed into water, and a circulating pump supplying said steam generator with water from said steam cooling means, the improvement in that said steam cooling means comprises a first condenser used for transferring the released heat given by said steam from said expander to the air used for burning said fuel in said combustion chamber, and a second condenser condensing steam from said first condenser to water therein, said first condenser being so constructed to be lower in its heat exchanging effect than that of said second condenser.

4,023,368

HIGH DENSITY-THIRD DIMENSION GEOMETRY SOLAR PANELS

Donald A. Kelly, 58 - 06 69th Place, Maspeth, N.Y. 11378

Filed Aug. 26, 1975, Ser. No. 607,918
Int. Cl.² F03G 7/02; H01L 31/00
U.S. Cl. 60—698 10 Claims



1. High density third dimension geometry solar panels comprised of multiple elongate triangular cross-section panels containing multiple squarish solar cells on all three surfaces of said panels,

dual identical elongate side reflectors disposed parallel to two lower sides of said multiple elongate triangular cross-section panels,

multiple uniformly disposed supporting fins secured to said multiple elongate triangular cross-section panels and said dual identical elongate side reflectors,

top edges of said dual identical elongate side reflectors positioned at a horizontal distance equal to nearly one-half the width of said multiple squarish solar cells,

each of said multiple elongate triangular cross-section panels is pivotally mounted along their longitudinal geometric axes within a rectangular elevated open frame structure,

multiple vertical support posts supporting said rectangular elevated open frame structure,

the lower ends of said multiple vertical support posts are mounted on flat level rooftop surfaces,

a crankarm secured at one end of each of said multiple elongate triangular cross-section panels,

a cross link pivotally mounted and secured to the lower end of each said crankarm,

connection at the end of said cross link to a crankarm pivotally mounted and secured to a timing disc,

a pendulum drive and connection means revolving said timing disc, an escapement mechanism controlling the revolution rate of said timing disc,

multiple vertical wind turbines centrally disposed on each of said multiple vertical support posts,

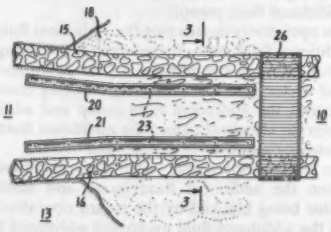
drive transmission means from the base of said multiple vertical wind turbines rotatably connected to multiple D.C. generators disposed within protective housings secured to rooftop surfaces.

4,023,369

PREVENTION OF SAND BAR FORMATION AT OUTLETS INTO THE SEA OR OTHER BODIES OF WATER

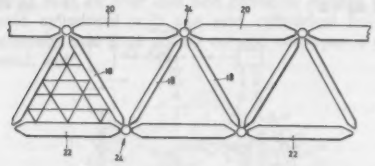
Leonard Gregson Wirasinha, Mount Lavinia, Ceylon, assignor to Don Bernard Wijesiriwardena, Arcadia, Calif.

Filed Nov. 18, 1975, Ser. No. 633,130
Claims priority, application Ceylon, Nov. 19, 1974, 7298
Int. Cl.² E02B 3/00
U.S. Cl. 61—2 6 Claims



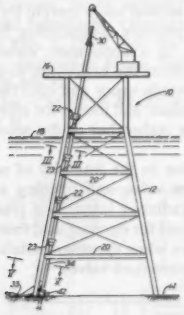
2. Apparatus for preventing formation of a sand bar from silt at the outlet of a body of water emptying from inland into another body of water such as a lake or the sea and the like comprising, at least one elongated gutter closed at opposite ends disposed at an outlet of a body of water flowing from inland through said outlet into another body of water, said gutter having at least a length extending over the first-mentioned body of water at said outlet and above the mean level of the water of said another body of water, means for flowing water into said gutter to fill it to an overflowing condition so that water received therein overflows along the length thereof and drops by gravity to water below it to maintain the last-mentioned water agitated to maintain silt transported therein in suspension to avoid formation of a sand bar along said outlet, and means supporting said gutter above the level of said last-mentioned water.

4,023,370
FLOATING BREAKWATER
James Gabriel Oliver Watson, 11 Cull Ross Road, Bryanston, Sandton, Transvaal, South Africa
Filed May 29, 1975, Ser. No. 581,862
Claims priority, application South Africa, June 4, 1974, 74/3522
Int. Cl.² E02B 3/04
U.S. Cl. 61—5 8 Claims



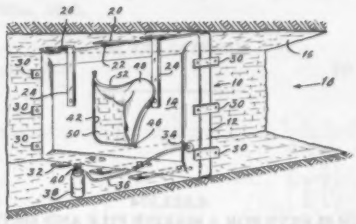
1. A floating breakwater including a plurality of rigid bodies that are elongated when viewed from above, at least some of which are buoyant, means joining the ends of a plurality of the bodies in end-to-end relationship to form a sea wall, means joining the ends of another plurality of the bodies in end-to-end relationship to form a lee wall parallel to but spaced from said sea wall, and a plurality of rigid substantially submerged members attached to and extending between and interconnecting said sea and lee walls to define between said members and said walls horizontally enclosed upwardly and downwardly open water spaces which extend between the walls, the surfaces of said bodies and members that define said spaces being planar, rigid and substantially impervious to the flow of water, said members being elongated when viewed from above and so arranged that no two sides of a said space are parallel to each other, whereby wave motion entering said spaces produces a complex set of random motions of the water within said spaces thereby to dissipate wave energy within said spaces.

4,023,371
RISER FOR AN OFFSHORE PLATFORM
Randolph Bryant, Jr., Katy, Tex., assignor to Gulf Research & Development Company, Pittsburgh, Pa.
Filed May 27, 1976, Ser. No. 690,403
Int. Cl.² F16L 1/00; E05D 1/06
U.S. Cl. 61—110 7 Claims



1. Apparatus for installing a flow line riser pipe at an offshore platform comprising a plurality of vertically spaced guide funnels mounted in alignment on the frame of the platform, a casing extending downwardly through the guide funnels, said casing having a hole in the wall thereof near its lower end, a riser extending downwardly through the casing, said riser having a substantially 90° bend at its lower end and a substantially horizontal leg extending outwardly through the hole in the wall of the casing, an inwardly facing opening in the wall of each guide funnel extending the full length thereof through which the horizontal leg passes on lowering the riser, an orienting funnel in alignment with the guide funnels, an oblique orienting slot in the wall of the orienting funnel, and a lug extending outwardly from the casing positioned to enter the slot and turn the casing on downward movement of the casing.

4,023,372
MEANS TO SEAL-OFF PORTIONS OF UNDERGROUND MINES AND THE LIKE
Donald P. Presler, Millstadt, Ill., and Donald G. Didow, Fiorissant, Mo., assignors to Oberjuerge Rubber Company, St. Louis, Mo.
Filed Apr. 17, 1975, Ser. No. 568,993
Int. Cl.² E21F 1/14
U.S. Cl. 61—45 R 17 Claims

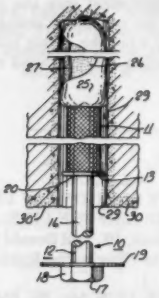


1. Means to form a barrier in a passageway comprising a member formed of a relatively flexible material including a continuous hollow peripheral portion forming a border thereof of a size and shape to generally conform to the size and shape of the passageway, said peripheral portion defining an enclosed space therewithin, and said member also including a web portion extending across and closing the space defined within the hollow peripheral portion, means to support the member in a suspended position extending across the passageway at a desired location, a source of gas pressure and means for communicating said source to the hollow peripheral portion of the member to inflate said portion whereby said portion expands outwardly and bears against the surfaces of the passageway in which it is installed, the hollow peripheral portion of said member being sufficiently flexible to relatively uniformly distribute the pressure produced during expansion thereof against the passage and to form a relatively airtight connection therebetween.

4,023,373
ANCHOR BOLT ASSEMBLY AND UTILIZATION
Edward C. Hipkins, Oakdale, Pa., assignor to Union Forge, Inc., Noblestown, Pa.
Filed June 14, 1976, Ser. No. 695,724
Int. Cl.² E21D 20/02
U.S. Cl. 61—45 B 12 Claims

1. A bolt assembly for mounting in position within a bore hole extending inwardly from the face of a rocklike structure such as a mine roof to reinforce the structure comprising, elongated anchor means for insertion into a bore hole to fracture a capsule containing a quick-setting adhesive, a headed bolt having a threaded stem portion threadably received within a threaded bore in one end of said anchor means and stop means carried on the stem of said bolt at a predetermined position below said one end of said anchor means to initialy limit the extent of threadable advancement of said

stem portion into the threaded interior of said anchor means by engaging said one end of said anchor means, said stop



means releasable upon application of a predetermined thread advancing torque to said bolt relative to said anchor means.

4,023,374

REPAIR SLEEVE FOR A MARINE PILE AND METHOD OF APPLYING THE SAME

Ervin A. Colbert; Richard J. Mann, and Robert W. Phillips, all of Centralia, Ill., assignors to Symons Corporation, Des Plaines, Ill.

Filed Nov. 21, 1975, Ser. No. 634,273
Int. Cl.² E02D *5/60*
U.S. Cl. 61—54 **7 Claims**

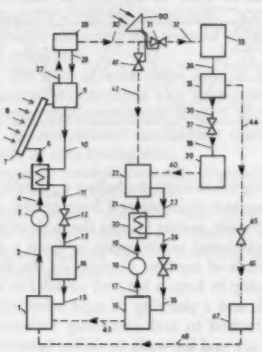
1. The method of reinforcing a vertical column-like concrete pile which, in association with similar piles, serves to support the platform of a marine pier or the like, said method comprising fashioning an open-ended, tubular repair sleeve which is conformable in outline to the peripheral contour of the pile, the longitudinal extent of which is somewhat greater than the depth of water surrounding the pile, and which has at least one pair of side edges that are formed with normally spaced reentrant bends establishing reentrant flanges which are capable of being brought together in interlocking relationship, causing said repair sleeve to encompass the pile while supported on the pier foundation in centered relationship with the pile so as to project above the normal water line, interlocking said reentrant flanges to close the sleeve and establish a narrow continuous void around the pile, and pouring a semi-liquid grout material into said void from above the water line so as to fill the void, whereby, upon hardening of such grout material, the strength of the hardened grout material will secure said interlocked reentrant flanges against dislodgment.

4,023,375

WATER-AMMONIA REFRIGERATION SYSTEM USING SOLAR ENERGY

James C. V. Chinnappa, and David D. Karran, both of Georgetown, Guyana, assignors to The University of Guyana, Guyana

Filed Mar. 14, 1975, Ser. No. 558,385
Claims priority, application United Kingdom, Oct. 23, 1974, 24739/74
Int. Cl.² F25B *27/00*
U.S. Cl. 62—2 **6 Claims**



1. A water-ammonia refrigeration system using solar energy, comprising

a. a first ammonia solution circuit including a solar radiation heater connected to a high pressure deabsorbing boiler for producing ammonia vapor, a reabsorber for ammonia vapor, and a pump for circulating rich solution to the heater and boiler and returning weak solution to the reabsorber;

b. a second ammonia solution circuit including a reabsorber for ammonia vapor, a low pressure deabsorbing boiler to produce ammonia vapor and cool the solution for cooling purposes, and a pump for circulating weak solution from the boiler to the reabsorber;

c. an ammonia vapor circuit including means having a first valve therein for conveying ammonia vapor from the high pressure deabsorbing boiler of the first solution circuit to the reabsorber of the second solution circuit;

d. an ammonia vapor and liquid ammonia circuit including means having a second valve therein for conveying vapor from the high pressure deabsorbing boiler of the first solution circuit to a condenser, means for conveying liquid ammonia from the condenser to evaporator means to produce ammonia vapor and cool the liquid ammonia for cooling purposes, and means for conveying the ammonia vapor to the reabsorber of the second liquid circuit; and

e. means responsive to the intensity of solar radiation for closing said first valve and opening said second valve when the solar radiation intensity is greater than a predetermined valve and for opening said first valve and closing said second valve when the solar radiation intensity is less than said predetermined valve.

4,023,376

FOOD REFRIGERATING METHOD

Hirohumi Onodera, 340, Mizuhai, Higashiosaka Osaka, Japan

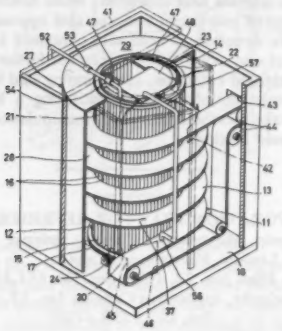
Filed July 31, 1975, Ser. No. 600,849
Claims priority, application Japan, May 31, 1975, 50-66817
Int. Cl.² F25D *17/02*
U.S. Cl. 62—63 **4 Claims**

1. A method for refrigerating food items and the like comprising:

positioning a vertically-spiral endless belt conveyor for carrying thereon said items to be refrigerated within a cylindrical partition wall for thermally insulating said conveyor from the atmosphere, said cylindrical wall having a plurality of openings therethrough surrounding said conveyor for allowing said conveyor to pass therethrough;

moving said belt conveyor by engaging it with a motor driven rotary cylindrical framework positioned inside the center of said spiral belt conveyor;

passing cold air over said belt conveyor moving between said cylindrical wall and said cylindrical framework, whereby said food placed on said conveyor is refrigerated; and



positioning an external adiabatic partition wall around said cylindrical framework, said belt conveyor, and said cylindrical wall, to provide a space for preliminarily cooling and dehumidifying atmospheric air before it passes into the space surrounding said belt conveyor between said cylindrical framework and said cylindrical wall, said external wall also having a plurality of openings therethrough corresponding to the openings in said cylindrical wall and surrounding said belt conveyor for allowing said belt conveyor to pass through said external wall and to allow food to be placed on said conveyor belt and removed therefrom.

4,023,377

DEFROSTING SYSTEM IN A COMPRESSION REFRIGERATOR

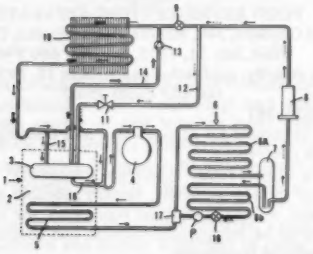
Shozo Tomita, Okayama, Japan, assignor to Kabushiki-Kaisha Nishinihon Seiki Seisakusho, Okayama, Japan

Filed Feb. 3, 1976, Ser. No. 654,902

Claims priority, application Japan, Feb. 5, 1975, 50-15919; Apr. 15, 1975, 50-50637

Int. Cl.² F25B *41/00, 47/00*

U.S. Cl. 62—196 B **4 Claims**



1. A defrosting system for use in a compression refrigerator having a high-pressure pipeline extending from a compressor to an expansion valve via a condenser and a low-pressure pipeline extending from said expansion valve to said compressor via an evaporator, said system comprising a defrosting tank connected to said high-pressure pipeline and means for periodically delivering liquid refrigerant thereto, said defrosting tank being connected to the inlet of said evaporator and to the outlet of said evaporator and inlet of the compressor so as to constitute a closed path in which a refrigerant vapour circulates, and a heating means to heat said defrosting tank at a raised temperature sufficient to cause any refrigerant when supplied to said defrosting tank to change from the liquid to vapour phase in said defrosting tank, the defrosting tank being located below the level of the evaporator to facilitate circulation of the refrigerant during a defrosting cycle.

4,023,378

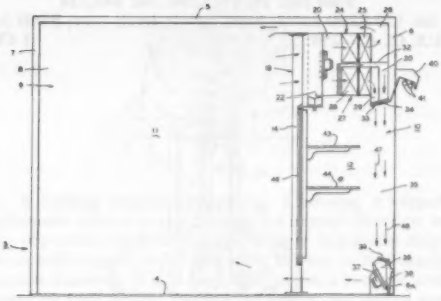
REFRIGERATION SYSTEM INCORPORATING A SINGLE AIR CIRCULATION MEANS FOR A COMBINATION REFRIGERATED DISPLAY CASE AND WALK-IN COOLER

Thomas E. Kennedy; Earl E. Butts, and Melvin W. Steelman, all of Niles, Mich., assignors to Tyler Refrigeration Corporation, Niles, Mich.

Filed Aug. 1, 1975, Ser. No. 601,576

Int. Cl.² A47F *3/04*

U.S. Cl. 62—256 **10 Claims**



1. A refrigeration system for a combination walk-in cooler and refrigerated display case, the display case having an access opening at the front thereof for unimpeded access to the product therein, the system comprising:

first means for refrigerating the walk-in cooler,

second means for refrigerating the refrigerated display case,

means for establishing a plurality of air curtains extending substantially vertically across the access opening in front of the refrigerated display case serving to oppose the passage of ambient air through the access opening into the refrigerated display case, said means establishing at least an inner curtain of cooled air and an outer curtain of partially cooled air,

barrier means disposed within said system for environmentally isolating the walk-in cooler portion from the display case portion of the combination,

first air passage means associated with the first refrigerating means for carrying refrigerated air therefrom to the walk-in cooler portion of the combination,

second air passage means associated with the second refrigerating means for carrying refrigerated air to the access opening of the display case and to said means for establishing air curtains whereby said means forms at least an inner curtain of cooled air with the refrigerated air from said second refrigerating means, and

first air circulating means for supplying air to both the first and second refrigerating means for circulation therethrough and through respective first and second air passage means from the walk-in cooler and for supplying air

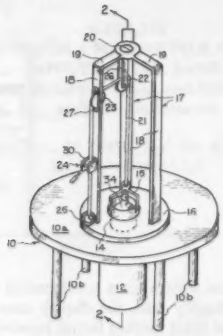
directly to said means for establishing air curtains for forming an outer curtain of partially cooled air, second air circulating means for circulating air passing through the air curtains from said display case, through said barrier means to the walk-in cooler portion of said combination whereby the first refrigerating means cools a first portion of air from the first air circulating means to one lower temperature, the first portion of air being carried by the first passage means into the walk-in cooler portion of the combination, and the second refrigerating means cools a second portion of the air from the first air circulating means to a second lower temperature, the second portion of air being carried by the second passage means to the air curtain forming means, then utilized with a third portion of air from the first air circulating means to form air curtains across the access opening in the front of the refrigerated display case, the second and third portions of air circulated through the walk-in cooler by the second air circulating means before being returned through the first air circulating means with the first portion of air to the first and second refrigerating means for recooling first and second portions thereof.

4,023,379

DINING TABLE WITH A REFRIGERATED WELL THEREIN AND MEANS FOR USING SAID WELL

John Zevlakis, 205 W. Main St., Carrboro, N.C. 27514

Filed Dec. 29, 1975, Ser. No. 644,724
Int. Cl.² F25D *23/12*; B66C *23/60*; A62D *1/14*; B66D *5/16*
U.S. Cl. 62—258 1 Claim



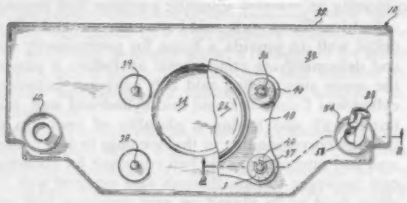
1. A dining table having a generally flat top formed with a normally open, approximately central opening therein, a refrigerated compartment formed with a normally open, approximately central top opening and fixed to the under side of the table's top in vertical communication with and approximately in vertical alignment with the latter's said opening, a food holding container adapted for reception within said compartment, and elevating means comprising a pulley assembly coacting with the table's said top and with said container and manually operable at a point adjacent to said table top for vertically shifting said container within said compartment; said pulley assembly including a trestle fixed to said table top and extending thereabove approximately in vertical alignment with said compartment, said pulley assembly being supported by said trestle and including pulley-wheel means at an upper portion of said trestle, a cable, a first portion of which is attached to said container and extends upwardly therefrom to and about said pulley-wheel means, and a second portion of said cable extending downwardly from said pulley-wheel means and adapted for manual operation to move said container vertically within said refrigerated compartment; said table, further, including a brake mechanism carried by said trestle and coacting with said cable to hold said container in an elevated position relatively to said compartment; said brake mechanism comprising coacting brake members having opposed surfaces between which and in braking contact with which said cable extends, spacing between said braking members being manually adjustable to reduce the braking effect of said braking contact; one of said brake members being fixed to said trestle, and another of said brake members, carried by said trestle and movable relatively to said fixed brake member, being yieldably biased to urge its said opposed surface toward the said opposed surface of said fixed brake member to brake the movement of said cable, and said movable brake member being manually movable oppositely to said biasing to reduce said braking effect; said movable brake member being generally oval and so pivotally mounted eccentrically as to permit said cable to slide relatively unimpeded in one direction between said opposed surfaces during operation of said pulley assembly to elevate said container, while holding said cable against material movement between said opposed surfaces in the opposite direction to hold said container in an elevated position; and said movable brake member further including an integral, weighted extension, accentuating said biasing of said movable brake member, and constituting a handle of the movable brake member, facilitating manipulation of the latter to oppose said biasing.

4,023,380

EVAPORATION TRAY FOR REFRIGERATORS

Clause Drouin, Montmagny, Canada, assignor to Les Industries Bfg Limitee, Montmagny, Canada

Filed Jan. 22, 1976, Ser. No. 651,418
Claims priority, application Canada, Jan. 15, 1976, 243888
Int. Cl.² F25B *47/00*
U.S. Cl. 62—279 8 Claims



1. An evaporation tray for use in a refrigerator equipped with a compressor and a drain tube for draining water formed from melted frost, comprising: a molded plastic body having a bottom wall and upwardly extending peripheral sidewalls; a series of mounting posts integral with said bottom wall and extending upwardly therefrom, said compressor being mounted on said posts above a portion of said bottom wall; and well means integral with said bottom wall for receiving said water discharged from said drain tube and for retaining therein a portion of said water to form a water seal.

4,023,381

FOOD REFRIGERATING APPARATUS

Hirohumi Onodera, 340, Mizuhai, Higashiosaka, Osaka, Japan

Filed July 31, 1975, Ser. No. 600,850
Claims priority, application Japan, May 31, 1975, 50-66817
Int. Cl.² F25D *25/02*
U.S. Cl. 62—381 3 Claims

1. An apparatus for refrigerating and freezing items, said apparatus comprising:

a motor driven, rotary cylindrical framework;

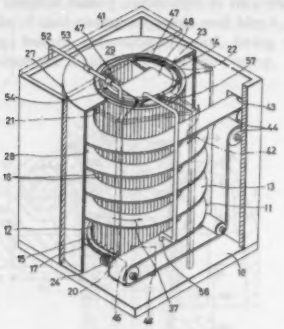
conveyor means vertically, spirally movable engaging the outside of said cylindrical framework for carrying said items to be refrigerated thereon and rotating with said cylindrical framework;

air cooling means within said cylindrical framework for supplying and directing cooled air across said conveyor means;

first partition walls means surrounding and spaced from the

outer edge of said conveyor means for thermally insulating said conveyor means, said partition wall means having a plurality of openings therethrough surrounding said conveyor means for allowing said conveyor means to pass through said first partition wall means; and

second partition wall means surrounding and spaced from said first partition wall means for providing a space to cool and dehumidify air before the air reaches said conveyor means within said first partition wall means, whereby frost is prevented from forming on said conveyor means and said items on said conveyor means, said second wall means having a plurality of openings therethrough corresponding to said openings in said first wall means, said opening surrounding said conveyor means for allowing said conveyor means to pass therethrough and allowing said items on said conveyor means to be placed thereon and removed therefrom.



4,023,382

BALL CAGE FOR A CONSTANT VELOCITY UNIVERSAL JOINT

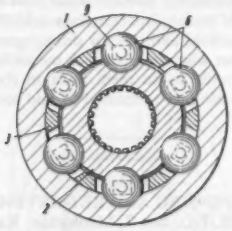
Hans-Heinrich Welschof, Rodenbach, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach, Main, Germany

Filed June 23, 1975, Ser. No. 589,575

Claims priority, application Germany, June 22, 1974, 2430025

Int. Cl.² F16D *3/30*

U.S. Cl. 64—21 **8 Claims**



1. A constant velocity universal joint comprising an outer joint element having a bore therethrough and a plurality of grooves in the surface of said bore, an inner joint element within said bore and having a plurality of grooves in its outer surface corresponding in number to and opposite from said outer joint element grooves to define pairs of opposed grooves, a plurality of balls between said joint elements with each ball being in a pair of opposed grooves, a cage between said joint elements and having a plurality of radial openings therein to retain said balls in a plane bisecting the angle between the outer and inner joint elements when the joint is bent and perpendicular to the axis of said cage, said openings having surfaces parallel with said plane and engaged by said balls, and a supporting plate between each ball and a portion of the opening surface contacted by each ball and parallel to each ball plane, said supporting plate having a plane surface engaging said opening surface and one of a concave spherical surface or a groove engaging said ball in surface or line contact respectively.

4,023,383

ELECTRICALLY CONTROLLED NEEDLE SELECTOR ARRANGEMENT FOR KNITTING MACHINES

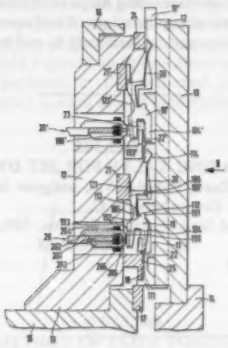
Dieter Klinger, Aistaig, Germany, assignor to Mayer & Cie, Talfingen, Germany

Filed Apr. 21, 1976, Ser. No. 679,134

Claims priority, application Germany, May 3, 1975, 2519896

Int. Cl.² D04B *15/66, 15/68, 15/78*

U.S. Cl. 66—50 R **15 Claims**



1. A knitting machine comprising: a housing; a support displaceable relative to said housing in a support direction; an array of parallel needle holders spaced apart in a needle direction on said support and displaceable thereon in said needle direction transverse to said support direction; a two-arm lever pivoted on each of said holders and having one forked arm formed with an actuating foot and with an anchor foot spaced by a gap from said actuating foot, and another arm, each lever being pivotal between an operative position and an inoperative position; a slide cam on said housing extending in said support direction and engageable with said actuating feet of said levers in said operative positions thereof to displace said levers in said needle direction on relative displacement of said support on said housing in said support direction; a spring on each holder engaging the respective lever and biasing same into one of said positions; a tip cam on said housing extending in said support direction and engageable with said other arm to pivot said levers on said holders between said positions; and control means for displacing said anchor feet and including at least one magnet on said housing alignable with said anchor feet for displacing said levers against the biasing force of said spring into the other of said positions.

4,023,384

KNIT TUBULAR ARTICLE WITH TRANSVERSE WAIST OPENING

Paolo Conti, and Massimo Bianchi, both of Florence, Italy, assignors to Billi, S.p.A., Florence, Italy

Filed Apr. 12, 1974, Ser. No. 460,583

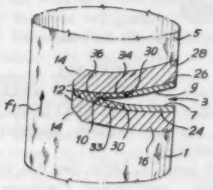
Claims priority, application Italy, Apr. 13, 1973, 9419/73

Int. Cl.² D04B *9/46*

U.S. Cl. 66—172 E **4 Claims**

1. A knit construction for the waist portion of a one-piece panty hose comprising a tubular knit portion having a waist opening therein extending partially around the circumference

of said tubular portion and having a transverse dimension greater than its longitudinal dimension, an outer edge zone on each side and at each end of said opening and said outer edge zone having an elastic yarn in selected courses thereof, an-



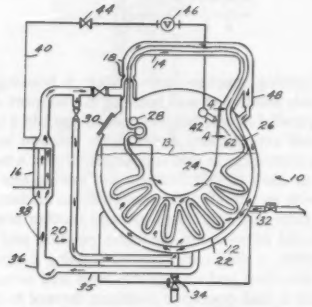
other edge zone immediately adjacent each side edge and each end of said opening selected loops of selected courses formed with the corresponding loops of the succeeding course whereby the fabric along the edges of said opening offer a high degree of elasticity and an tendency to roll up.

4,023,385

OSCILLATING VALVE FOR JET DYE BECK

Audrey Grant Hurd, Pulaski, Va., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Sept. 2, 1975, Ser. No. 609,814
Int. Cl.² D06B 3/28
U.S. Cl. 68—62 14 Claims



1. A jet dyeing machine for treating textiles with treating liquids having a kier, a jet, a cloth guide tube, means for forming a treating liquid circulation path for withdrawing treating liquid from said kier and supplying treating liquid to said jet and including a circulation pump and heat exchanger located in the circulation path for thetreating liquid, wall means defining at least one fabric storage area having an entrance portion and an exit portion and at least one doffing jet having a nozzle, means for supplying liquid to said doffing jet so as to power said doffing jet the improvement comprising:

slot means for channeling liquid discharged from said doffing jet, said slot means being positioned adjacent said entrance portion of the fabric storage area;

said doffing jet having an axis being positioned inwardly of said wall means defining said fabric storage area and aligned with said slot means, the axis of said doffing jet being at an angle ranging between about 25° to about 40° down from horizontal; and

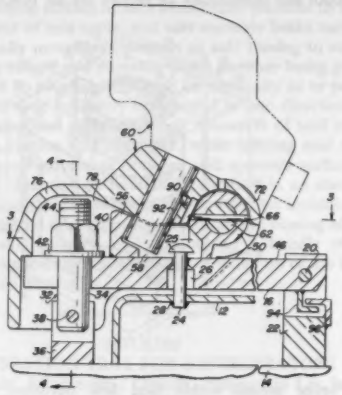
oscillating valve means for causing the doffing jet to operate intermittently, said oscillating valve means being positioned in the treating liquid circulation path between said doffing jet and said heat exchanger.

4,023,386

COVER LOCK ASSEMBLY

Russell W. Walters, Richmond, Ky., assignor to BMR Security Products Corporation, Richmond, Ky.

Filed July 9, 1975, Ser. No. 594,301
Int. Cl.² B65D 55/14; F16B 41/00
U.S. Cl. 70—164 13 Claims



1. A lock assembly for maintaining a cover positionally fixed with respect to a rigid frame comprising:

a guard member passing over at least a portion of said cover,

securement means mounted to said rigid frame and releasably secured to said guard member,

an integral lock housing and strike member, said lock housing being pivotally mounted through rotative means to a wall of said strike member, said strike member being rigidly secured to said guard member with said strike member and lock housing being separate from said securement means,

said lock housing being rotatable between (1) a first position covering said securement means and said strike member and (2) a second position exposing said securement means and said strike member,

a cylindrical bar lock extendable through a wall of said lock housing separate from said rotative means (1) for engagement with said strike member when said bar lock is in a lock position thereby to constrain said lock housing in said first position, and (2) for disengagement from said strike member when said bar lock means is unlocked and pulled outwardly to an open position thereby allowing said lock housing to be rotated to said second position.

4,023,387

CABLE DISPENSING AND RETRIEVING DEVICE

Ronald Jay Gould, P.O. Box 7, Manhattan, Kans. 66502

Filed Feb. 9, 1976, Ser. No. 656,334
Int. Cl.² B62H 5/14
U.S. Cl. 70—233 8 Claims

1. Securing means for frame objects comprising, in combination,

an elongate, hollow casing constructed of forceresistant material,

a block fixed in one end of said casing and having a passage therethrough communicating with the casing interior,

an elongate, cable fixed at one end to the casing interior wall adjacent the block, said cable of a length nearly twice the interior length of the casing and extending outside of said casing through said passage,

an elongate plug on the free end of said cable exterior of said casing,

a socket in said block adapted to removably receive a portion of said plug,

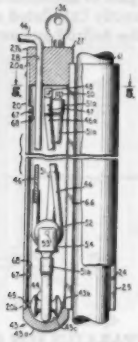
engaging means in said block operable to releasably engage said plug portion when it is in said socket,

and means inside said casing operative to return said cable into said casing after use and normally resiliently retain same therewithin,

the cable return and retaining means comprising:

a piece of surgical tubing connected at one end thereof to the inside of said casing adjacent said block,

said tubing, before extension thereof, being of a length greater than the inside length of the casing,



a shaft across the casing at the end thereof opposite the block,

a pulley frame including a pulley engaging said cable inside of the casing,

said tubing extending the length of the casing from its attachment, passing around said shaft and connecting with its free end to the pulley frame,

whereby drawing the cable out of the casing moves the pulley frame toward the block and places the length of surgical tubing in tension around said shaft, so that continuous tension is exerted on the cable until it is returned into said casing.

4,023,388

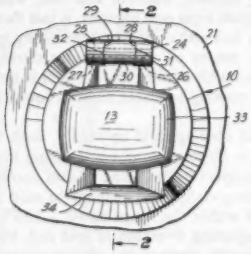
LOCK COVER DEVICE

Gabor Morvai, Mount Royal, Canada, assignor to Dominion Lock Company Ltd., Montreal, Canada

Filed Aug. 9, 1976, Ser. No. 712,547

Int. Cl.² E05B *17/18*

U.S. Cl. 70—455 **3 Claims**



1. A lock seal apparatus arranged to be mounted to a lock and selectively shiftable between a stable keyway sealing position and a keyway exposing position, comprising a resilient polymeric lock head cover member, said cover member including a front face portion having a circular access aperture adapted to register with the keyway of said lock, side wall portions, and an inturned rear mounting flange member in parallel spaced relation to said front face portion, said flange member being adapted to engage behind and support said cover against removal from said lock, a shutter member hingedly connected to said cover member shiftable between a sealing position in which a rear face of said shutter is engaged against said front face, and an exposing position in which said shutter is cleared from said front face, and hinge means interposed between said shutter member and said cover member, said hinge means including a pair of spaced parallel resilient upstanding posts extending from one said member, said posts including transversely directed, coaxially aligned apertures and opposed, inwardly facing, generally parallel wall portions, a central segment extending from the other said member disposed between said posts, said segment having outer side wall portions juxtaposed to said wall portions of said posts, said segment including a transverse aperture in coaxial alignment with the apertures of said posts, a hinge pin extending through said apertures of said posts and segment securing said segment to said posts for pivotal movement about said axis, and complemental cam and follower means formed on said posts and segment, said cam and follower means being positioned resiliently to deflect said posts responsive to relative movement of said segment and posts about said axis, said cam and follower portions, in the deflected condition thereof, urging said shutter toward one of said stable positions.

4,023,389

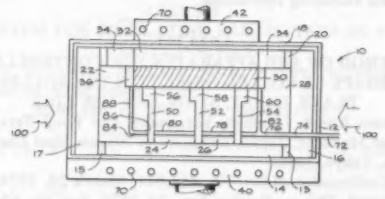
METHOD OF FLOW FORMING

Gordon L. Dibble, Fontana, and Stewart T. Russell, Hawthorne, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed June 16, 1976, Ser. No. 696,606

Int. Cl.² B21B *9/00*; B21D *22/00*

U.S. Cl. 72—38 **7 Claims**



1. A method for making a metallic structure comprising:

providing a metal preform;

providing a plurality of shaping members;

positioning the shaping members to define a chamber surrounding the preform, the chamber defining a surface substantially complementary to the desired final shape of the preform, a portion of the surface being defined by at least two of the shaping members, the at least two shaping members being spaced from one another, the at least two shaping members defining a groove therebetween;

heating the preform to a temperature suitable for flow-forming;

compressing the preform by application of pressure through at least one of the other shaping members whereby the preforms against the at least two shaping members and into the groove; and

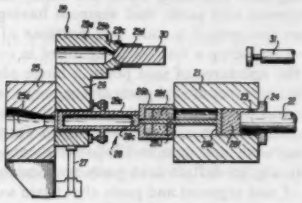
forcing the at least two shaping members to move in contiguous relationship, thereby reducing the size of the groove while forcing the preform to further deform into the groove.

4,023,390

MACHINE FOR USE IN HYDROSTATIC EXTRUSION

Masao Nishihara, Kyoto; Yoshihiro Yamaguchi, Ashiya; Tomiharu Matsushita, Nishinomiya; Tatsuo Yamasaki, Kobe; Masataka Noguchi, Nishinomiya, and Kunihiko Nishioka, Kobe, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Division of Ser. No. 398,861, Sept. 19, 1973, Pat. No. 3,939,682. This application Dec. 4, 1975, Ser. No. 637,776
Int. Cl.² B21D *22/10*
U.S. Cl. 72—60 3 Claims



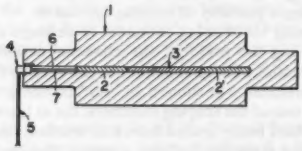
1. A hydrostatic extrusion machine comprising:
a container movable along and aligned with the center line of said hydrostatic extrusion machine,
a press platen located forwardly of said container,
a sliding member interposed between said press platen and said container and mounted transversely slidably on said press platen with respect to said center line of said machine,
a die block, having a die, provided on said sliding member so as to define an extrusion station.
a device for supplying pressure medium into said container provided on said sliding member so as to define a charging station, and
a first hydraulic cylinder means mounted on said press platen and operatively connected to said sliding member for reciprocatingly sliding said sliding member between said extrusion and charging stations so as to alternatively disposed said pressure medium supplying device and said die along said center line of said machine for charging and extruding operations.

4,023,391

METHOD OF AND APPARATUS FOR CONTROLLING THE SHAPE OF ROLLED OBJECTS IN THE ROLLING OF PLATE, SHEET, STRIP AND THE LIKE

Norimasa Kamii; Choshiro Yamamoto, and Ryoji Terakado, all of Muroran, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 453,021, March 20, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,738
Int. Cl.² B21B *27/08*
U.S. Cl. 72—200 6 Claims



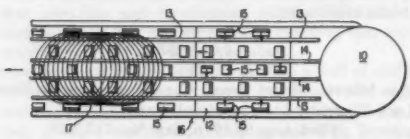
1. In the method of controlling the cross-sectional shape of products in the rolling of such material as metallic plate, sheet or strip with work rolls, the improvement which comprises heating the work rolls each having a center hole of a considerably smaller diameter than the diameter of said rolls themselves and provided along the central axis of said rolls, the rolls being solid except for said center hole, by providing in said center hole a heat source and controllably applying heat from said heat source to the roll from within the hole and in the radial direction of the work rolls at a rate per unit time and per unit length of the roll for producing a sufficient temperature gradient substantially near and around said center hole, said gradient being established radially outwardly from said center hole for expanding the work rolls in the radial direction thereof for changing the amount of the roll crown and controlling the cross-sectional shape of the rolled product and said heat being applied in an amount which at most has only an insignificant effect on the surface temperature of the roll, whereby the amount of heat necessary for producing the temperature gradient and which is based on the initial crown of the work rolls, the size of the rolled material, weights per unit time and the aggregate of the material rolled and rolling temperature, can be directly calculated and the heat source controlled to produce the desired amount of heat.

4,023,392

METHOD AND APPARATUS FOR COOLING HOT ROLLED ROD

Tatsu Fujita, Kobe; Yoshiro Yamada, Akashi; Atsuo Mizuta; Tetsuo Yamada, both of Kobe; Osamu Tsuda, Kobe; Tsugio Kaneda, Akashi; Shinichi Shimazu, Kobe, and Yukio Wada, Osaka, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Jan. 19, 1976, Ser. No. 650,448
Claims priority, application Japan, Jan. 18, 1975, 50-8096
Int. Cl.² B21B *45/02, 43/08;* B21F *21/00;* C21D *1/62*
U.S. Cl. 72—201 7 Claims



1. A method for cooling a rod of a coil form immediately after hot-rolling thereof, wherein said rod, whose loops are spaced a given pitch from one another, is laid flat upon rails of a planar cooling bed and conveyed therealong in a transporting direction by means of endless chains during which time said rod is cooled with cooling fluid which is being projected from below said cooling bed, said method comprising the steps of:

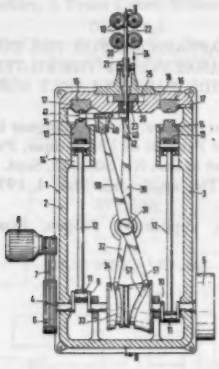
projecting said cooling fluid upwardly, such that said projected fluid is directed at an angle within the range of 10° – 70° with respect to the plane of said cooling bed and as viewed orthogonally with respect to said plane of said cooling bed within the range of 10° – 150°0 with respect to the transporting direction of said rod, toward said rod disposed directly above said rails and chains of said cooling bed; and

projecting said cooling fluid upwardly, such that said projected fluid is directed at an angle within the range of 15° – 75° with respect to the plane of said cooling bed and as viewed orthogonally with respect to said plane of said cooling bed within the range of 30° – 150° with respect to the transporting direction of said rod, toward the overlapped lateral circumferential portions of a series of loops of said rod.

4,023,393
ECCENTRIC PRESS

Klaus Messerschmidt, Schonungen, Germany, assignor to Sebastian Messerschmidt Spezial-maschinenfabrik, Schonungen, Germany

Filed July 15, 1976, Ser. No. 705,726
Claims priority, application Germany, July 16, 1975, 2531760
Int. Cl.² B21D *28/00*
U.S. Cl. 72—337 14 Claims

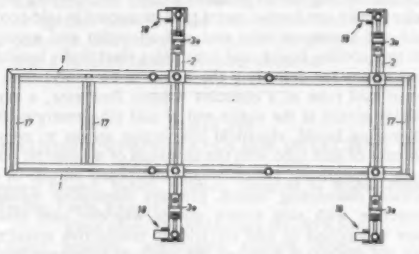


1. A press for forming articles such as sphere-like objects and the like from workpieces comprising a frame, a crankshaft rotatably mounted on said frame, said crankshaft having crank arms, movable dies actuated by each of said crank arms, two fixed mating dies mounted on said frame, a stationary shearing bushing means disposed between said two fixed dies, means for feeding an elongated rod to said shearing bushing means, said shearing bushing means having an entry side and an exit side, a movably mounted shearing knife means mounted on the entry side of said shearing bushing means for cutting blanks from said elongated rod, a movably mounted feeding means mounted on the exit side of said shearing bushing means and operable to simultaneously receive a cut blank at the exit side of said shearing bushing means while delivering another cut blank to one of said fixed dies.

4,023,394
VEHICLE ALIGNMENT APPARATUS

Jörgen Borup, Vaxjo, Sweden, assignor to AB Nike Hydraulik, Eskilstuna, Sweden

Filed Feb. 19, 1975, Ser. No. 551,193
Claims priority, application Sweden, Feb. 20, 1974, 74022526
Int. Cl.² B21D *1/12*
U.S. Cl. 72—457 10 Claims



1. Apparatus for the repair of damaged vehicle body structure which apparatus is adapted for securing to the vehicle body or frame and supports force-applying apparatus and also supports measuring apparatus to permit concurrently the repair of damaged parts and the making of measurements relative to selected datum points, and being further adapted to render the damaged vehicle movable, said apparatus comprising:

vehicle support means including detachably connectable first frame means and second frame means,

said first frame means including a plurality of first beams and a plurality of clamping means for clamping said first beams to a part of the vehicle body or frame in horizontal parallel spaced relationship to each other transversely of the vehicle's longitudinal axis when said vehicle is raised at least at one end thereof above a supporting surface such as a floor,

first roller means comprising rollers at spaced locations along each of said first beams for supporting said first beams at a first predetermined height above the supporting surface,

second frame means including a pair of spaced parallel longitudinal beams each having a length at least equal to that of the vehicle body,

second roller means at spaced locations along said second frame means for supporting said second frame means at a second predetermined height above said supporting surface which is so related to said first predetermined height as to permit the rolling insertion of said second frame means under said first frame means when said vehicle and first frame means are lowered to said supporting surface while said first frame means supports thereon a vehicle body, said rollers of said first frame means being sufficiently spaced along said first beams to avoid interference with said second frame means at the time of its insertion under said first frame means,

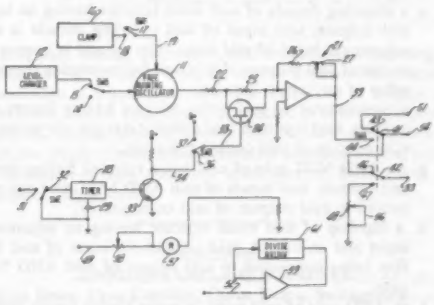
means for detachably securing said first frame means to said second frame means at each point of intersection of each said first beam with each said longitudinal beam,

and force applying means detachably supported on said vehicle support means for application of a force to a structural part of the vehicle for restoring said part to its original configuration.

4,023,395
SYSTEM FOR SIMULATING PARAMETERS OF A TESTING DEVICE

James E. Grumblatt, St. Clair, Mich., assignor to Selim R. Rahme, St. Clair Shores, Mich.

Filed Jan. 22, 1976, Ser. No. 651,510
Int. Cl.² G01P *21/02*
U.S. Cl. 73—2 11 Claims



1. A checker for simulating the test parameters of a sensor and tone wheel associated with an anti-skid system; said checker comprising:

generator means for generating a signal simulating the rotational velocity of said tone wheel, the output frequency of the generator means representing said rotational velocity;

level changer means for controlling the output frequency of said generator means;
electric control means receiving the output of said generator means over an impedance;
means for selectively shorting at least some of said impendance;
and means for selectively preventing said generator means from providing an output above a predetermined frequency.

4,023,396

IMPACT IMPULSE MEASURING DEVICE

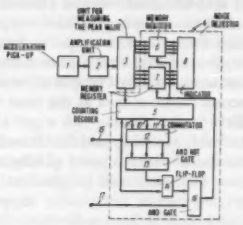
Alexandr Sergeevich Yakshin, ulitsa Malaya Filevskaya, 66, kv. 104; Oleg Nikolaevich Novikov, ulitsa Kuznetsky most, 18/7, kv. 6; Dmitry Alexeevich Grechinsky, ulitsa Tolbukhina, 8, korpus 2, kv. 48; Viktor Alexandrovich Klochko, ulitsa Oktyabrskaya, 38, kv. 374, and Viktor Georgievich Rygalin, Dorozhny proezd, 5, korpus 2, kv. 103, all of Moscow, U.S.S.R.

Filed Dec. 15, 1975, Ser. No. 640,451

Claims priority, application U.S.S.R., Dec. 19, 1974, 2087455

Int. Cl.² G01P *15/04*

U.S. Cl. 73—12 **5 Claims**



1. An impact impulse measuring device comprising:
a. an acceleration pick-up for transforming a mechanical shock into electrical signals having an output;
b. an amplification unit having an input and an output, said input of said amplification unit being connected to said output of said acceleration pick-up;
c. a unit for measuring the peak value of an impact impulse having an input and outputs, said input of said unit for measuring the peak value of an impact impulse being connected to the output of the amplification unit;
d. a noise rejector electrically connected to said unit for measuring the peak value of an impact impulse and having information inputs and an adjustment input;
e. a counting decade of said noise rejector having an input and outputs, said input of said counting decade is said adjustment input of said noise rejector and is connected to one of said outputs of said unit for measuring the peak value of an impact impulse;
f. a commutator of said noise rejector having inputs and outputs, said inputs of said commutator are connected to said outputs of said counting decade;
g. an AND NOT gate of said noise rejector having inputs and outputs, said inputs of said AND NOT gate are connected to said outputs of said commutator;
h. a flip-flop of said noise rejector having an adjustment input and an output, said adjustment input of said flip-flop being connected to said output of said AND NOT gate;
i. an AND gate of said noise rejector having inputs and an output, one of said inputs of said AND gate being connected to said output of said flip-flop;
j. a transcription line of said noise rejector, another of said inputs of said AND gate being connected to said transcription line;
k. memory registers of said noise rejector having information inputs, an adjustment input and outputs, said adjustment input of said memory registers being connected to said output of said AND element, said information inputs of said memory registers being connected to said outputs of the unit for measuring the peak value of an input impulse which are not connected to said counting decade; and
l. an indicator connected to said outputs of said memory registers.

4,023,397

METHOD AND APPARATUS FOR THE CONTINUOUS AUTOMATIC ANALYSIS OF THE FILTERABILITY POINT OF LIQUIDS, PARTICULARLY DOPED DIESEL OIL

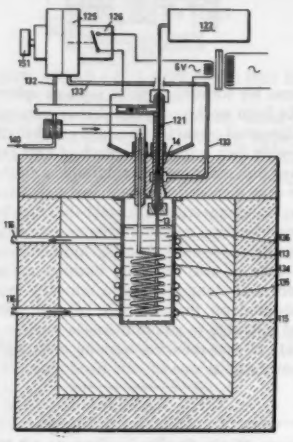
Paul Ouvrard, Saint Nazaire, France, assignor to Societe Anonyme Dite: Antar Petroles de l'Atlantique, Paris, France

Continuation-in-part of Ser. No. 505,645, Sept. 13, 1974, Pat. No. 3,945,243. This application Mar. 4, 1976, Ser. No. 663,775

Claims priority, application France, Sept. 19, 1973, 73.33670

Int. Cl.² G01N *25/04*

U.S. Cl. 73—17 R **11 Claims**



1. Apparatus for the continuous automatic measure of the filterability threshold temperature of a liquid substance comprising a container for a cooling liquid, a cooling liquid substantially filling said container, said cooling liquid having a freezing temperature substantially lower than the average filterability threshold temperature of the type of liquid to be analyzed, cooling means adapted to cool said cooling liquid, an electrically conductive metal tube immersed in said cooling liquid and having an inlet end and an outlet end emerging from said cooling liquid, said tube being electrically insulated, pump means for delivering the liquid to be analyzed to the inlet of said tube at a constant volume flow rate, a crystal retaining means at the outlet end of said tube emerging from said cooling liquid, electrical connecting means to connect both ends of said tube with the terminals of an electric power supply, respectively, switch means interposed on one of said electrical connecting means, pressure responsive means in connection with said switch means whereby said electric power is supplied to said electrically conductive metal tube when the difference between the pressure measured just before said crystal retaining means and the pressure measured just beyond said crystal retaining means exceeds a first predetermined value and suspends said supply of electric power when said pressure difference reaches a second predetermined value lower than said first value, thermosensitive means

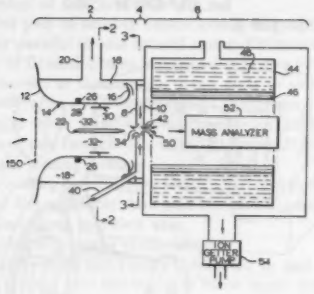
adapted to measure the temperature of the liquid to be analyzed just beyond said crystal retaining means, and means for recording the temperature measured by said thermosensitive means.

4,023,398

APPARATUS FOR ANALYZING TRACE COMPONENTS

John Barry French, 4 Thornbank Road; Neil M. Reid, 165 Royal Orchard Blvd., both of Thornhill, Ontario, and Janette A. Buckley, 6 Tepee Court, Willowdale, Ontario, all of Canada

Filed Mar. 3, 1975, Ser. No. 555,202
Int. Cl.² G01N *31/00*
U.S. Cl. 73—23 **13 Claims**



8. A method of transferring matter or species between a vacuum chamber and a gaseous medium, comprising:

a. supplying said gaseous medium at a selected pressure to a first region,

b. selecting a curtain gas which, when deposited in solid phase at a predetermined temperature, has a vapour pressure substantially less than atmospheric pressure,

c. directing said curtain gas into a second region adjacent said first region at a pressure greater than said selected pressure, and thereby preventing said gaseous medium from entering said second region,

d. directing at least some of said curtain gas from said second region into said vacuum chamber,

e. cooling at least a portion of the interior surface of said vacuum chamber to below said predetermined temperature, whereby to condense said curtain gas on said portion of said interior surface, thereby evacuating said vacuum chamber,

e. and moving said matter or species along a path extending from said first region through said second region and through the curtain gas in said second region, and into said vacuum chamber, whereby said curtain gas functions to prevent said gaseous medium from entering said vacuum chamber while permitting movement of said matter or species between said first region and said vacuum chamber, and also by its condensation functions to maintain a vacuum in said vacuum chamber.

4,023,399

METHOD AND APPARATUS FOR DETECTING THE PRESENCE OF YARNS

Bernard Isoard, Ecully, France, assignor to Rhone-Poulenc-Textile, Paris, France

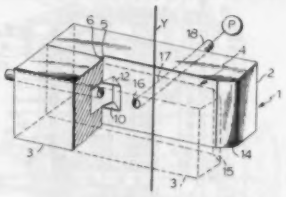
Filed Mar. 18, 1975, Ser. No. 559,534
Claims priority, application France, Mar. 22, 1974, 74.10430
Int. Cl.² G01B *13/00*; B65H *63/02*
U.S. Cl. 73—37.7 **8 Claims**

1. A sensor for detecting the presence of yarns including

a. a pair of substantially planar walls, said walls being parallel and spaced from each other to form a narrow yarn zone,

b. said narrow yarn zone being of sufficient width to pass a yarn freely therebetween,

c. gas supply means including a single delivery outlet for directing a flow of gas between said walls in a direction parallel to said walls and against said yarn zone,



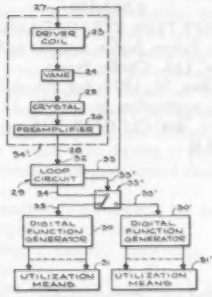
d. and pressure sensing means including a pressure-sensing aperture in one of said walls intermediate said gas supply means and said yarn zone aligned with said delivery outlet along the axis of flow of the gas therethrough, so as to detect the changes of pressure in the narrow zone due to the presence of the yarn.

4,023,400

VISCOSIMETER AND/OR DENSITOMETER

Milton H. November, Hacienda Heights, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 23, 1976, Ser. No. 716,823
Int. Cl.² G01N *11/16*
U.S. Cl. 73—54 **7 Claims**



2. A fluid sensing instrument, said instrument comprising: a probe having an input lead, an output lead and a structure immersible in a fluid and vibratable responsive to a signal on said input lead; a loop circuit connected between said probe input and output leads to vibrate said structure; and means to shift the phase of said signal alternately to make the frequency of vibration of said structure insensitive to density and to viscosity, respectively.

4,023,401

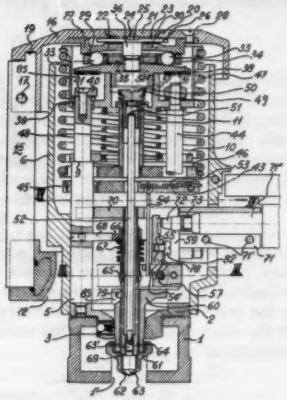
HAND-OPERABLE DUROMETER

Alfred Ernst, Casa Carolina, Curio Ticino, Switzerland

Filed Mar. 8, 1976, Ser. No. 664,471
Claims priority, application Switzerland, Mar. 12, 1975, 3141/75; Apr. 10, 1975, 4596/75
Int. Cl.² G01N *3/42*
U.S. Cl. 73—81 **18 Claims**

1. A hand-operable durometer constructed to be hand-pressed against a surface whose hardness is to be tested, and

including a comparator upon which said hardness can be read, including a first and a second assembly, the latter at least partly surrounding the first assembly and being movable to a limited extent relative thereto, the first assembly having a facing surface positioned to be pressed against the surface whose hardness is to be tested, the second assembly including a penetrator tip movable towards the first-mentioned surface



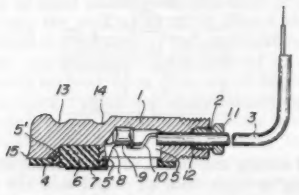
and relative to said facing surface; the durometer further including means connecting said first and second assemblies for movement laterally relative to each other and means indicating the relative lateral positions of said two assemblies, whereby the said two assemblies can take up respective positions such that in use the thrust applied to the durometer is directed substantially axially of the second assembly.

4,023,402

UNIT TYPE STRAIN GAUGE

Osamu Watanabe, Tokyo, Japan, assignor to Kyowa Electronic Instruments Co., Ltd., Chofu, Japan

Filed Dec. 31, 1975, Ser. No. 645,892
Claims priority, application Japan, Feb. 22, 1975, 50-22266
Int. Cl.² G01B 7/16
U.S. Cl. 73—88.5 R **14 Claims**



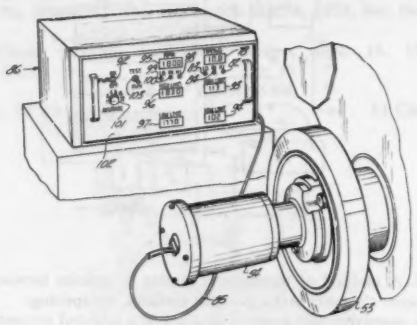
8. A unitary stain gauge comprising; a protective outer casing made of a hard material having an internal space open at one side and a lead cable inlet at one end of the casing, wherein said open side is made substantially flat surface having step shaped projecting flanges, a packing located within said step flanges having a surface to fit the open side of the casing and another surface to fit an outer surface of an object in which strains are to be measured and having thickness to slightly project from the surface of the step shaped projecting flanges, a pressing member made of an elastic material arranged in the internal space of the casing in such a manner that one surface thereof very slightly projects from outer face of the packing, a strain gauge element mounted on the projecting surface of the pressing member, a terminal member having ribbon wires for providing electric connection to the strain gauge element and terminals for providing electric connection for wires of a lead cable, the remainder of the inner space of the casing being substantially filled by an elastic filling material in an extent sufficient to keep said pressing member, said terminal element and a portion of said lead cable in position and to provide dust proof and water proof construction, pressing member having a Shore hardness between 60 to 70, the packing a Shore hardness about half of said value and the filling material a Shore hardness about 1/5 of that of the packing member.

4,023,403

METHOD AND APPARATUS FOR TIMING DIESEL ENGINES

Richard Lawrence Smith, Livonia, Mich., assignor to Scans Associates, Inc., Livonia, Mich.

Filed July 11, 1975, Ser. No. 595,019
Int. Cl.² G01M 15/00
U.S. Cl. 73—119 A **49 Claims**



1. A method of determining the timing angle of a single cylinder of a diesel internal combustion engine having at least one cylinder and an injection pump, with each cylinder having a piston, a fuel injector, and a corresponding fuel line communicating with said fuel injector, and said piston having a crankshaft connected thereto, selecting the single cylinder to be time, continuously monitoring the fuel pressure, including the related primary and secondary pressure waves occurring in the fuel line associated with said single cylinder, producing a signal each time the pressure in said fuel line reaches a predetermined pressure, locking out all subsequent pressure signals caused by said secondary pressure waves in a predetermined manner for a period not to exceed the next occurring primary pressure signal, continuously producing pulses of a predetermined and uniform angular frequency, producing a top dead center signal related to the moment the piston in said single cylinder reaches its top dead center position, continuously counting said uniform pulses from the moment of the occurrence of the pressure signal occurring immediately before the first of said subsequent locked out pressure signals to the moment of said top dead center signal, and relating said count of pulses to the timing angle of said engine, and if said pressure signal occurring immediately before the first of said locked out pressure signals is not primary pressure signal repeating said process until said signal is a primary pressure signal, thereby finding the timing angle of said engine.

4,023,404

FORCE MEASURING APPARATUS

Albert E. Brendel, Lake Orion, Mich., assignor to Lebow Associates, Inc., Troy, Mich.

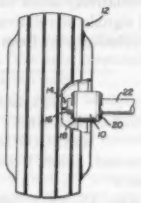
Filed May 7, 1976, Ser. No. 684,222
Int. Cl.² G01L 5/16
U.S. Cl. 73—133 R **7 Claims**

1. A device for measuring forces comprising:

1. a first structure adapted for measuring forces applied

along a first axis and a second structure adapted to measure forces along a second axis perpendicular to said first axis, said first and second structures being connected to each other and spaced along the third mutually perpendicular axis;

2. said first structure comprising:
   a. a first pair of parallel flexural beams extending in a direction parallel to said second axis and spaced apart along said first axis, the cross-section of said beams being proportioned to be resiliently yieldable to a relatively large degree to forces applied along said first axis while being substantially unyieldable to forces applied along said third axis;
   b. a first rigid hub located between said first pair of beams and rigidly connected thereto at a point intermediate their ends, said hub functioning as the force output member of said first structure;
   c. a first pair of sensing beams axially aligned with each other parallel to said second axis and between said first pair of flexural beams, said sensing beams being rigidly connected at their axially inner ends to said hub and extending in opposite directions therefrom;
   d. a rigid force input member rigidly connected to the ends of said flexural beams and to the axially outer ends of said sensing beams;
   e. said sensing beams being constructed and proportioned to be less yieldable than said flexural beams to forces applied along said first axis;
3. said second structure comprising:
   a. a second rigid hub rigidly connected to said first hub, said second hub serving as a force input member for said second structure;



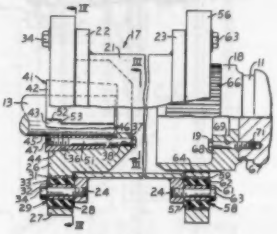
   b. a second pair of parallel flexural beams extending in a direction parallel to said first axis and spaced apart on opposite sides of said second hub in a direction parallel to said second axis, said beams being rigidly connected to said second hub at a point intermediate their ends, the cross-section of said beams being proportioned to be resiliently yieldable to a relatively large degree to forces applied along said axis while being substantially unyieldable to forces applied along said third axis;
   c. a second pair of sensing beams axially aligned with each other parallel to said first axis and located between said second pair of flexural beams, said sensing beams being rigidly connected at their axially inner ends to said second hub and extending in opposite directions therefrom, said sensing beams being constructed and proportioned to be less yieldable than said second pair of flexural beams to forces applied in a direction parallel to said second axis;
   d. a second rigid force output member rigidly connected to the ends of said second pair of flexural beams and to the axially outer ends of said sensing beams;
4. whereby, when force transducer means responsive to the resilient yielding of said sensing beams are secured thereto, said transducer means associated with said first pair of sensing beams will provide a signal proportional to the magnitude of forces applied to said first force input member along an axis parallel to said first axis, and said transducer means associated with said second pair of sensing beams will provide a signal proportional to the magnitude of forces applied to said first force input member along an axis parallel to said first axis.

4,023,405

TUNED QUICK CONNECT AND DISCONNECT COUPLING ARRANGEMENT

Larry Allen Larson, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 17, 1976, Ser. No. 687,121
Int. Cl.² G01L 3/16
U.S. Cl. 73—134 **8 Claims**



1. A tuned quick connect and disconnect coupling arrangement adapted to drivingly couple an output shaft of an internal combustion engine to a substantially axially aligned input shaft of a dynamometer for checking the power output of the engine and adapted for rapidly connecting the output shaft to and disconnecting the output shaft from the dynamometer input shaft, the coupling arrangement comprising:
   a tubular adapter having an external spline formed on its periphery, and a radially inwardly extending flange disposed at one end thereof adapted to be removably secured to the output shaft of the engine, and
   a tuned resilient coupling assembly secured to the dynamometer input shaft and having an internal spline adapted for meshing engagement with the external spline of the adapter for drivingly coupling the shafts to one another for unitary rotation about a common longitudinal axis and is disengageable therefrom for uncoupling the shafts from each other, the coupling assembly including:
   an annular ring containing the internal spline;
   an elongate torque tube having a pair of radially outwardly extending flanges secured thereto at its opposite ends;
   first means resiliently connecting the annular ring to one of the flanges of the torque tube;
   a hub having a radially outwardly extending flange formed thereon;
   second means resiliently connecting the outwardly extending flange of the hub to the other flange of the torque tube; and
   means for securing the hub to the dynamometer input shaft for imparting rotation thereto including a diametral tapered bore formed in the hub, means operatively associated with the dynamometer input shaft for providing an external tapered surface complementary to the tapered bore, and means operatively connected to the hub to axially draw the external tapered surface into wedging gripping relation with the tapered bore to drivingly interlock the hub to the dynamometer input shaft.

4,023,406

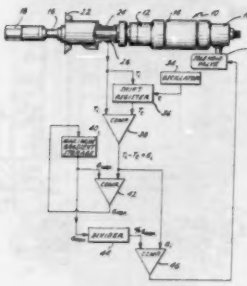
TIGHTENING SYSTEM WITH TORQUE-TIME CONTROL

John W. Benz, Jr., Ambler, Pa., assignor to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Mar. 31, 1976, Ser. No. 672,094
Int. Cl.² G01N 3/22
U.S. Cl. 73—139 **12 Claims**

1. Apparatus for tightening a threaded fastener system to a predetermined tightened condition comprising:

means for applying torque to said fastener system;
means for measuring the torque applied to said fastener system and providing a signal indicative thereof;
means for developing a signal indicative of incremental time;
gradient calculating means receiving said torque signals and said incremental time signals for developing a signal representative of the instantaneous torque gradient of the



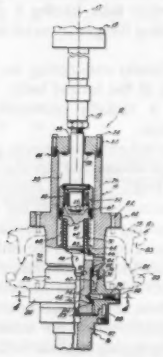
torque-time curve through which said fastener system is being tightened; and
means responsive to said torque gradient signal for determining the yield point or other predetermined tightend condition on the torque-time curve through which the fastener system is being tightened and for developing a control signal when said fastener system is tightened to said point.

4,023,407

CHUCK FOR TIRE UNIFORMITY MACHINE

Robert S. Vanderzee, Akron, Ohio, assignor to Akron Standard, division of Eagle-Picher Industries, Inc., Akron, Ohio

Filed Jan. 19, 1976, Ser. No. 650,131
Int. Cl.² G01M *17/02*
U.S. Cl. 73—146 **10 Claims**



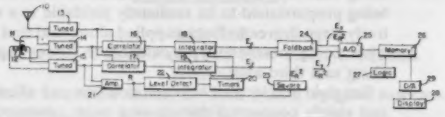
1. A chuck for a tire testing apparatus comprising,
a first member having a pawl receiving surface and having a plurality of pawls radially mounted therein;
a second member axially movable with respect to said first member having a pawl receiving surface;
a plunger in said second member; and
means for moving said members together;
said plunger camming said pawls into engagement with said pawl receiving surfaces when said two members are brought together to lock said members together.

4,023,408

STORMSCOPE

Paul A. Ryan, and Nicholas Spitzer, both of Columbus, Ohio, assignors to Dytronics Company, Inc., Columbus, Ohio

Continuation of Ser. No. 540,186, Jan. 10, 1975, abandoned.
This application June 10, 1976, Ser. No. 694,620
Int. Cl.² G01W *1/00*
U.S. Cl. 73—170 R **35 Claims**



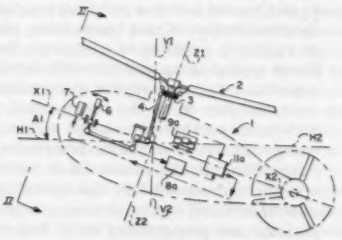
1. A system for detecting electrical disturbances generated by weather phenomena, and for displaying such disturbances for ready observation with reference to an observation location comprising,
receiving means for receiving electrical signals generated by said weather phenomena in a predetermined frequency band,
processing means, connected to said receiving means, for processing said received signals and providing processed signals whose amplitude is inversely related to said received signals, and
display means driven by said processed signals to display said processed signals by designating locations, relative to said observation location, determined by said processed signals,
whereby received signals of relatively large magnitude will be displayed relatively close to said observation location and received signals of relatively smaller magnitude will be displayed relatively far from said observation location.

4,023,409

DEVICE FOR MEASUREMENT OF THE SPEED OF A HELICOPTER

Bernard Marie Durand, Salon, France, assignor to Etat Francais, Paris, France

Filed Aug. 15, 1975, Ser. No. 605,179
Claims priority, application France, Aug. 22, 1974, 74.28786
Int. Cl.² G01C *21/10*
U.S. Cl. 73—178 H **10 Claims**



1. In a helicopter having at least one lift rotor and an arrangement for effecting cyclic command of rotor pitch, measurement apparatus for determining the air speed of the helicopter, and indicator means for indicating the determined air speed, said measurement apparatus comprising two substantially identical measurement systems for measuring respectively velocity along the longitudinal and transverse axes of the helicopter, each said measurement system comprising a first detector for detecting the position of the cyclic rotor pitch command member along the corresponding axis and providing a corresponding position signal, a second detector for detecting the acceleration component along the same axis

and emitting a corresponding signal, and computing means for receiving said signals and effecting integration of the algebraic sum of the values measured by said first and second detectors for said corresponding axis, said indicator means being operatively associated with said computing means of each said measurement system for indicating measured velocity along said longitudinal and transverse axes.

4,023,410

FLUID FLOW METER

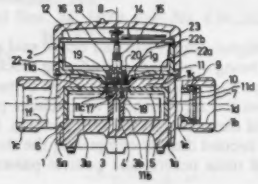
Robert Althaus, Therwil, Switzerland, assignor to Aquametro AG, Switzerland

Filed July 23, 1975, Ser. No. 598,220

Claims priority, application Switzerland, July 24, 1974, 10191/74

Int. Cl.² G01F *1/075*

U.S. Cl. 73—229 **7 Claims**



1. A meter for measuring flow of fluid comprising, in combination:

a housing defining a metering chamber;

flow rate responsive means rotatably mounted in said chamber;

a first rotary element of non- magnetizable material drivingly connected to said flow rate responsive means to be rotatable about a rotational axis;

indicating means supported by said housing;

a second rotary element of non-magnetizable material connected to said indicating means and mounted to be rotatable about said rotational axis

two magnetically separated first permanent magnets each provided on said first rotary element and disposed symmetrically with respect to said rotational axis with their respective axes of magnetisation extending substantially parallel thereto and being oppositely directed;

two magnetically separated second permanent magnets each provided on said second rotary element and disposed symmetrically with respect to said rotational axis with their respective axes of magnetisation extending substantially parallel thereto and being oppositely directed; and

a wall member of substantially non-magnetisable material extending between said first and second rotary elements;

each said permanent magnet comprising a pair of similarly poled physically separate, component permanent magnets having respective planar surfaces abutting against one another in a plane extending substantially parallel to said rotational axis.

4,023,411

TEMPERATURE MEASURING DEVICE

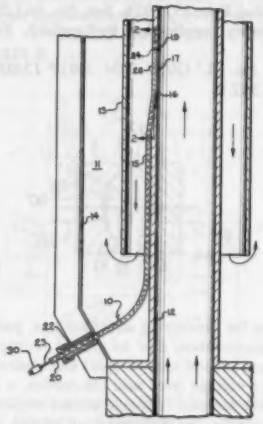
Hans Escher, 19 Trentino Road, Turramurra, New South Wales 2074, Australia

Filed Nov. 5, 1975, Ser. No. 628,985

Int. Cl.² G01K *7/02*

U.S. Cl. 73—349 **11 Claims**

4. A heat exchanger having an enclosure, heat transfer walls and a device for measurement of the temperature at a point in the heat transfer walls, said device comprising a tubular conduit, one end of said conduit extending from the heat exchanger enclosure and the other temperature measurement end of said conduit being sealed and affixed within one of said heat transfer walls adjacent such point, wherein said temperature measurement end of said conduit does not protrude from said one wall, a connector between said enclosure and said tubular conduit, and temperature sensitive means removably



positioned within said conduit, said temperature sensing means being adapted for insertion from the outside of said enclosure through said conduit to such point at which a temperature measurement is required adjacent said temperature measurement end of said conduit.

4,023,412

METHOD AND APPARATUS FOR DETECTING TEMPERATURE VARIATION UTILIZING THE CURIE POINT OF A FERROMAGNETIC MATERIAL

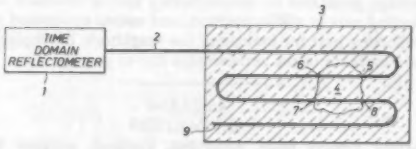
Robert J. Luke, Upton-by-Chester, and Ronald C. Robson, Wirral, both of England, assignors to Shell Oil Company, Netherlands

Filed July 8, 1975, Ser. No. 594,161

Claims priority, application United Kingdom, July 10, 1974, 30495/74

Int. Cl.² G01R *31/11*; G01K *7/38*

U.S. Cl. 73—362 CP **30 Claims**



1. A method for detecting temperature variation above or below a predetermined value, comprising:

a. transmitting an electrical signal of short duration along an electrical circuit in thermal contact with the area where the temperature variation is to be detected wherein the electrical circuit comprises:

1. at least two substantially parallel conductors insulated from each other; and

2. ferromagnetic material having a Curie point about equal to the predetermined temperature positioned between said parallel conductors;

b. detecting a reflection of the electrical signal; and

c. measuring the time interval between transmitting the signal and detecting the reflection thereof.

4,023,413
DEVICE FOR MEASURING ACCELERATIONS, PARTICULARLY ACCELERATIONS DUE TO GRAVITY

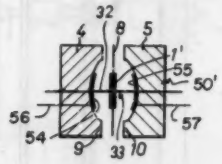
Siegfried Stauber, Zurich, Switzerland, assignor to Wyler AG, Switzerland

Filed Feb. 25, 1976, Ser. No. 661,273

Claims priority, application Switzerland, Feb. 27, 1975, 2488/75

Int. Cl.² G01V 7/04; G01P 15/08

U.S. Cl. 73—382 R **4 Claims**



1. A device for measuring accelerations, particularly components of acceleration due to gravity, comprising a stator having first and second spaced apart electrodes, power means for applying a voltage over said electrodes, a deflecting part suspended between said first and second electrodes and being displaceable under the influence of gravity in a direction toward one of said electrodes and away from the other of said electrodes and being of a material to produce an electrical signal proportional to the displacement of said deflecting part, said deflecting part comprising a single piece flat plate disc having no magnetic properties and having a central capacitor plate portion and a plurality of radially and circumferentially spaced narrow arcuate slots, said central plate portion being suspended within said disc by lands formed between said slots, the slots of said plate disc being so narrow as to restrict air flow therethrough so that said plate disc provide a fluid damping effect, the arcuate slots being arranged in spaced apart location around the circumference and in radially spaced groups, the radially spaced slots being offset from each other, said stator comprising a housing defining a chamber on each side of said deflecting part, indicating means comprising a transducer converting the voltage into a signal and an indicator connected to said transducer for indicating the magnitude of said signal, said power means supplying an alternating current voltage on said electrodes and including means for superimposing a direct current voltage upon the alternating current voltage, a controller connected to said power means for controlling the d.c. voltage, said deflecting part having a capacitor plate and generating a voltage upon deflection, said controller controlling the d.c. voltage as a function of the voltage generated by the deflecting part to maintain the deflecting part in a zero position, and means connected to said deflecting part for indicating the magnitude of displacement as a measure of the acceleration due to gravity.

4,023,414
ALTIMETERS

Arthur George Bone, Aldershot, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed July 8, 1976, Ser. No. 703,662

Claims priority, application United Kingdom, July 8, 1975, 28776/75

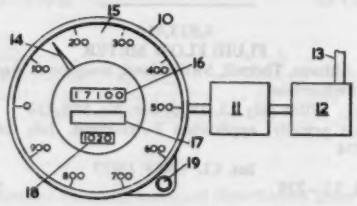
Int. Cl.² G01L 7/12

U.S. Cl. 73—387 **8 Claims**

1. A pressure sensitive altimeter having a display comprising:

a pointer which rotates through one revolution round a dial for each one thousand unit increment of altitude, rotation of said pointer being clockwise for increasing altitude, said dial having its zero at the nine o'clock position;

a first digital display situated above an axis of symmetry of the dial which passes horizontally through the zero, said first display being operative, considering clockwise movement of said pointer, only from a pointer position a predetermined distance before the zero position to a pointer position at least half a revolution from the zero position, the initial reading being the nearest thousands of units; and



a second digital display situated below said axis, said second display being operative, considering clockwise movement of said pointer, only from a position at most half a revolution from the zero position to a pointer position a predetermined distance past the zero position, the final reading on said second display comprising the thousands and last hundred units before said pointer passes the zero position.

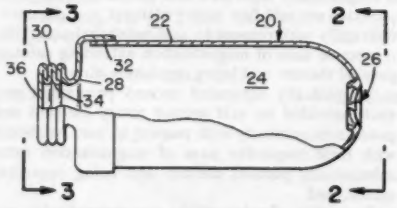
4,023,415
PRESSURE MONITORING DEVICE

George E. Garcia, Tiburon, Calif., assignor to G. E. Garcia; P. C. Jackson; T. G. Spragg; S. A. Childs; Edwin W. Randle; Thelma H. Randle and James G. Shields, all of Tiburon, Calif., part interest to each

Continuation-in-part of Ser. No. 462,081, April 18, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,730

Int. Cl.² G01L 7/06

U.S. Cl. 73—410 **12 Claims**



1. An actuator device responsive to pressure variations in a fluid medium surrounding and external to the device, comprising:

a vessel having wall means forming an enclosed chamber, said vessel being surrounded by the fluid medium;

one-way inlet check valve means in the wall means for allowing fluid of the external fluid medium to flow into the chamber and including internal pressure responsive means for biasing the check valve means toward and holding it in a closed position when internal chamber pressure exceeds external medium pressure, so that the chamber assumes substantially the external medium pressure as the medium pressure rises, and retains the maximum medium pressure attained if the medium pressure drops;

movable means connected to the wall means, biased toward a normally retracted position, for extending from the retracted position outwardly away from the wall means a predetermined limited distance in response to a decrease in pressure of the external fluid medium; and

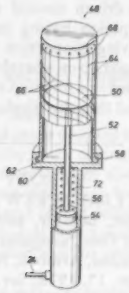
a relief valve in the wall means for allowing fluid to escape from the vessel whenever the pressure in the chamber exceeds the external medium pressure by a predetermined amount, said relief valve being operable in response to said predetermined amount of pressure differential independently of said movable means.

4,023,416

GAUGE MEANS FOR FLUID HANDLING APPARATUS

George S. Ormsby, Houston, Tex., assignor to Picenco International, Inc., Houston, Tex.

Filed Nov. 24, 1975, Ser. No. 634,362
Int. Cl.² G01L 7/16
U.S. Cl. 73—419 17 Claims



1. In a fluid handling apparatus containing a fluid having a fluid head, gauge means comprising:

gauge face means;

pressure sensitive indicator means disposed adjacent said face means, at least a part of said indicator means extending along said face means in a first direction, and at least a part of said indicator means being movable along said face means in a second direction generally transverse to said first direction, said movable part of said indicator means being operably exposed to the pressure in said fluid directing means to be moved in accordance with said pressure;

a first scale comprising a first series of indicia marks on one of said gauge face means or said indicator means, said marks progressing longitudinally along said extending part of said indicator means in said first direction and each mark of said first series corresponding to a given value of a first parameter; and

a second scale comprising a second series of indicia lines on said gauge face means, each line of said second series extending along said face means angularly with respect to said first and second directions and each line of said second series corresponding to a given value of a second parameter;

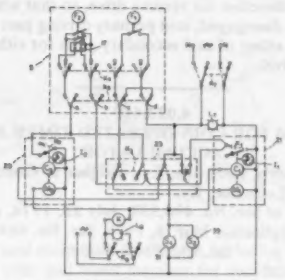
wherein one of said parameters is a function of the density values of said fluid and the other of said parameters is a function of the valve of said fluid head, and wherein said lines of said second series are configured and disposed with respect to said indicator means and said marks of said first series to reflect the relationship between said pressure, the density of said fluid, and said fluid head to provide an indication of one of said values in accordance with the other of said values and said pressure by movement of the movable part of the indicator means with respect to the second scale.

4,023,417

LIQUID SAMPLING

Charles Laird McClure, Malvern, Pa., assignor to Pro-Tech Inc., Paoli, Pa.

Continuation of Ser. No. 369,722, June 13, 1973, Pat. No. 3,863,506. This application Feb. 3, 1975, Ser. No. 546,632
Int. Cl.² G01N 1/14
U.S. Cl. 73—421 B 11 Claims



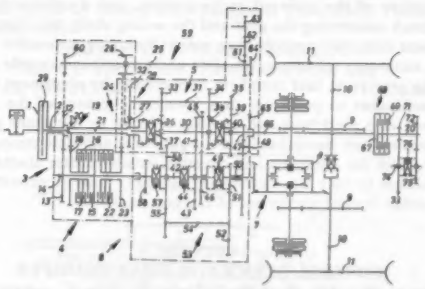
1. In pneumatically sampling liquid from a body thereof at predetermined intervals of time and for predetermined periods of time at each sampling, the combination of determining the sampling interval, determining the duration of sample propulsion, and displaying the time remaining in any current sampling interval and in any current period of sample propulsion.

4,023,418

CHANGE GEAR TRANSMISSION IN GROUP CONSTRUCTION, ESPECIALLY FOR LAND VEHICLES AND VEHICLES FOR THE BUILDING INDUSTRY

Walter Zenker, Bensberg-Refrath, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Feb. 3, 1975, Ser. No. 546,769
Claims priority, application Germany, Feb. 2, 1974, 2405023
Int. Cl.² F16H 37/00, 3/08, 37/06
U.S. Cl. 74—15.86 13 Claims



1. A geared transmission comprising: a first transmission group having a first input shaft and a first output shaft, a main second transmission group following the first transmission group and having a second input shaft and a second output shaft, a main output shaft driven by said second output shaft and connected to a load, said first transmission group having first clutch means engageable to provide a first forward drive stage between the said first input shaft and said first output shaft and a second drive stage between the said first input shaft and said first output shaft, providing an alternative drive between the said first input shaft and said first output shaft

upon disengagement of said first clutch means, said second drive stage including a selectively engageable friction clutch having a common primary driving part which is continuously connected through the said input shaft of said first group with the output side of a prime mover, and secondary driven parts interposed between said primary part and said first output shaft, one of said secondary parts being connected to said first output shaft for forward drive and the other of said secondary parts being connected to said first output shaft for driving in the opposite direction for reverse drive, so that with said first clutch means disengaged, said primary driving part may selectively engage either of said secondary parts for either forward or reverse drive.

4,023,419

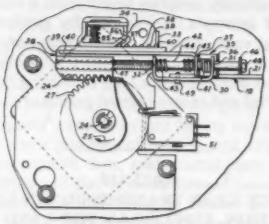
MECHANISM FOR COIN-OPERATED TIMER RUN TIME ACCUMULATOR

Robert D. Harris, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Continuation of Ser. No. 490,558, July 22, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,665

Int. Cl.² F16H *19/04*

U.S. Cl. 74—30 **6 Claims**



1. In a time accumulating means adapted to accumulate timer run time on a timer mechanism in response to an outward reciprocation of the slide of a coin-receiving mechanism from a fully inward position, wherein the time accumulating means rotates the setting shaft of said timer mechanism unidirectionally in response to an inward and outward reciprocation of the slide and comprises the elements of a gear rack associated with the slide for reciprocation therewith, a gear rotatably positioned to engage the gear rack during at least a portion of the outward reciprocation, and a unidirectional clutch connecting the gear and the setting shaft; the improvement comprising mechanism means including a member that is stationary relative to the slide and a member movable with the gear rack, said members cooperating by abuttment with each other to positively stop inward movement of the gear rack at a predetermined position relative to the timer gear, and resilient means between the gear rack and slide cooperating with the stationary and movable members after abuttment thereof to take up mechanism assembly tolerances without further inward movement of the gear rack.

4,023,420

CONTROL DEVICE FOR A BAR TRANSFER

Bruno Dressler, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

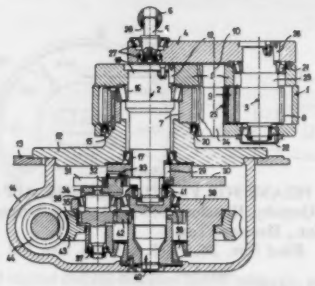
Filed Dec. 24, 1974, Ser. No. 536,097

Claims priority, application France, Dec. 28, 1973, 73.46912

Int. Cl.² F16H *37/12*

U.S. Cl. 74—52 **10 Claims**

1. Control device for bar transfer comprising a lever driven in rotation about a fixed axis, an arm rotatably mounted on said lever for rotation about an axis parallel to said fixed axis, said arm connected to the bar transfer by a catch-pin having an axis parallel to the aforesaid axes, said lever and said arm having the same length, means for driving the arm at a relative angular velocity double that of, and in the opposite direction to that of, said lever, and means for driving said lever comprising a fixed toothed gear wheel coaxial with said fixed axis of rotation of said lever and at least one planet pinion meshing



with and rotatably driven around said fixed toothed gear wheel, said planet pinion having an eccentrically disposed crank pin and a driving connection being provided between said crank pin and said lever whereby the angular velocity of said lever is modulated as a function of the cycloidal trajectory of said crank pin and thus the displacement of the bar.

4,023,421

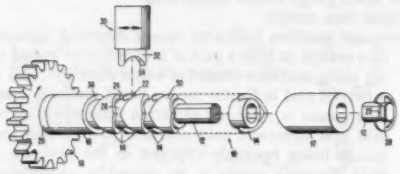
REVERSING LEAD SCREW CONSTRUCTION

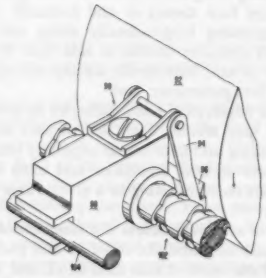
Richard Allen Berlier, Boulder, and Augustus Boyd Brown, Longmont, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,878

Int. Cl.² F16H *25/12*

U.S. Cl. 74—57 **23 Claims**





1. A molded segment for use with a plurality of identical segments to form a double helix reversing lead screw wherein:

said segment includes a substantially cylindrical outer surface, a top and a bottom;

a right-handed helical guideway present at said cylindrical surface;

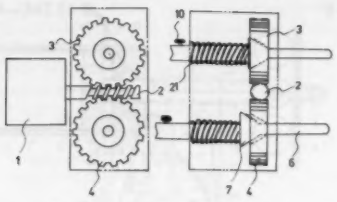
a left-handed helical guideway also present at said cylindrical surface, both said left and right-handed guideways being about one-half pitch or less.

4,023,422

INTERIOR AND OUTER WIPER OF CAR

Chiou Ming Jou, No. 38, Lane 34, Min-Chu Road, Pan-Chiao, and Yang Youn Kung, No. 21, Lane 127, Huai-Teh St., Nan-Tsueili, Pan-Chiao, both of China /Taiwan

Filed Jan. 16, 1976, Ser. No. 649,576
Int. Cl.² F16H *21/40*
U.S. Cl. 74—70 1 Claim



1. A windshield wiper assembly comprising:
a motor;
a worm gear driven by said motor;
first and second conical gears coupled to said worm gear so as to be rotated thereby, each conical gear having a conical shaped opening therethrough about an axis;
first and second coupling shafts each having a conical body for engagement with one of said conical openings so as to couple a shaft and conical gear together for rotation and each movable along said axis for engagement and disengagement;
first and second wiper blades for mounting inside and outside a windshield;
first and second link means respectively connecting said respective coupling shafts to respective wiper blades for causing reciprocal wiping movement of a wiper blade when the coupling shaft connected thereto is rotated; and
a cam having a first position disengaged from said shafts so that said shafts engage and rotate with said conical gears to reciprocate both said first and second wiper blades, a second position in which said cam engages only one of said shafts to cause said shaft to move along said axis and disengage from said conical gear so that only the wiper blade reciprocates which is connected to the other coupling shaft, a third position in which said cam engages both of said shafts to cause both shafts to move along said axis and neither of said blades to reciprocate and a fourth position in which said cam engages only said other of said shafts to cause said other shaft to move along said axis and disengage from said conical gear so that only the wiper blade reciprocates which is connected to said one shaft.

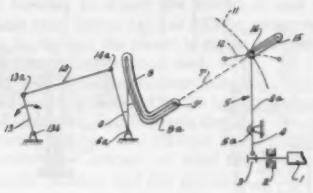
4,023,423

VARIABLE-STROKE AND FREQUENCY DRIVE

Hans Johne, Radebeul; Arndt Jentzsch, Coswig, and Günter Schumann, Radebeul, all of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed June 19, 1975, Ser. No. 588,469
Int. Cl.² F16H *21/44*
U.S. Cl. 74—96 8 Claims

1. A variable-stroke and -frequency drive, particularly for use with ink-distributing cylinders of printing machines, comprising means forming a four-bar kinematic chain having a support, an input member mounted on said support for pivoting movement about a first pivot, said input member including a portion formed with a guide channel, an elongated output member pivoted to said support imtermediate its end portions, and a link member having one end pivoted to one end portion of said output member for movement about a second pivot, and another end portion provided with a sliding block received at fixed locations in said guide channel for pivoting movement about a third pivot; an elongated element mounted on said support for lengthwise reciprocation and adapted to be coupled to said output member; and means for varying the stroke and for simultaneously varying the frequency of reciprocation of said reciprocating element, including a crank drive connected with said input member for oscillating the other members at each of said fixed locations so that said third pivot passes through a straight line extending through both said first and second pivots at one of said fixed locations for changing the direction of pivoting movement of said output member and thereby the direction of reciprocation of said element, to thereby effect different stroke and frequency characteristics for the element at said one fixed location as compared to the other of said fixed locations.

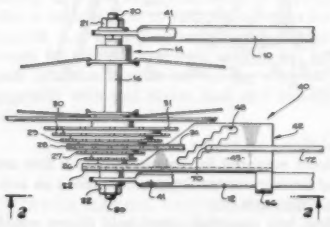


4,023,424

INBOARD DERAILLEUR FOR MULTISPEED BICYCLES

John W. Ryan, 674 Nimes Road, Los Angeles, Calif. 90024, and James D. Moore, 6810 Locklenna Lane, Palos Verdes, Calif. 90274

Filed Nov. 10, 1975, Ser. No. 630,152
Int. Cl.² F16H *9/00, 11/00;* B62M *9/00, 1/02*
U.S. Cl. 74—217 B 10 Claims

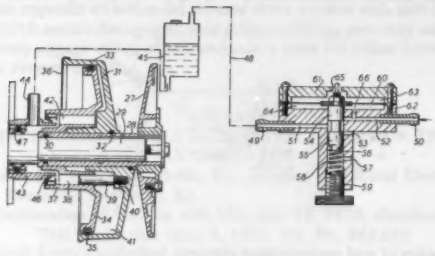


1. In a derailleur for a multispeed bicycle, having a plurality of rear sprockets and a drive chain, the improvement comprising mechanism for changing speeds by shifting the drive chain from one rear sprocket to another, said mechanism comprising a moveable transfer cage having sprocket means over which the chain passes, said mechanism being mounted inboard of the bicycle frame and having means for transferring the drive chain from one drive sprocket to another.

4,023,425
CENTRIFUGAL FLUID EXPANSIBLE PULLEY WITH MANIFOLD VACUUM CONTROL MEANS

Robert Henry Parker, Esher, England, assignor to A. C. Cars Limited, England

Filed Apr. 21, 1976, Ser. No. 678,768
Int. Cl. F16h *55/52, 55/56*
U.S. Cl. 74—230.17 E 6 Claims

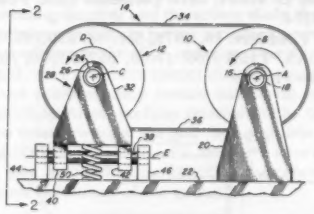


1. A pulley comprising a shaft operatively connected to driving means for rotating said shaft about its axis, a pulley having two flanges one of which is fixed to said shaft and the other of which is slidably mounted on said shaft, and a backplate fixed to said shaft and defining, with said movable flange, an annular chamber permanently connected to an external source of fluid said annular chamber containing a quantity of oil which acts on said movable flange in response to centrifugal force created by rotation of the shaft, to shift said movable flange towards said fixed flange, wherein said external source of fluid is a tank containing oil whereby a space above the oil in the tank is connected by a control valve to the intake manifold of an engine.

4,023,426
BELT STABILIZING APPARATUS

George R. Duryea, Jr., Buffalo, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Filed June 23, 1975, Ser. No. 589,286
Int. Cl.² F16H *7/18;* B65G *15/62*
U.S. Cl. 74—241 20 Claims

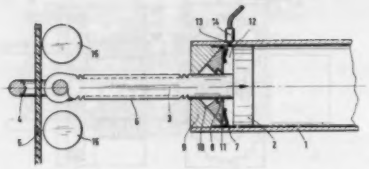


1. Belt stabilizing apparatus, comprising;
a. a first drum mounted for rotation about a first axis,
b. a second drum mounted for rotation about an axis parallel to said first axis,
c. an endless belt mounted about said drums providing a pair of a parallel spans between said drums,
d. means for permitting pivotal movement of said second drum, in response to lateral forces applied to said belt, about a second axis which is substantially perpendicular to said first axis and contained in a plane substantially parallel to the planes containing said spans, and
e. resilient means for limiting pivotal movement of said second drum about said second axis in response to lateral forces applied to said endless belt to prevent said belt from riding off said drums in a direction opposite to that of said lateral forces.

4,023,427
APPARATUS FOR TENSIONING A SAFETY BELT

Edmar Beier, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany

Filed Jan. 21, 1976, Ser. No. 650,878
Claims priority, application Germany, Feb. 11, 1975, 2505624
Int. Cl.² F16H *7/12, 7/10;* B60K *27/00;* B60R *19/00*
U.S. Cl. 74—242.1 FP 9 Claims

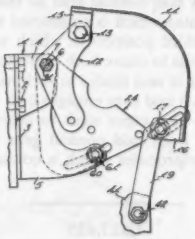


1. Apparatus for tensioning a safety belt in response to applied gas pressure, comprising:
a cylinder;
a piston, displaceable in said cylinder in a forward direction in response to said gas pressure and having toothings;
at least one slide surface, inclined relative to the axis of said cylinder and mounted to said cylinder;
at least one blocking wedge, supported on said slide surface and displaceable in response to said gas pressure to engage said toothings, thereby blocking the motion of said piston in a reverse direction;
and means, interconnecting said piston and said safety belt, for applying tension to said safety belt in response to the forward motion of said piston.

4,023,428
PIVOTAL MOUNT FOR BELT-DRIVEN DEVICE

Howard A. Dysard, Waterford, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 22, 1975, Ser. No. 643,317
Int. Cl.² F16H *7/10*
U.S. Cl. 74—242.13 R 10 Claims



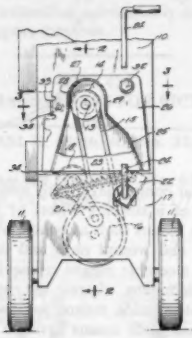
1. An apparatus for tensioning a belt of a belt-driven device comprising, an integral mount including a base plate forming two upright ends defining two axially aligned pivot holes on a pivotal axis, a belt-driven device having a rigid housing, a pivotal support on each end of said housing forming extensions of said housing, means defining axially aligned openings in said supports, connecting means connecting said supports to said housing, fastening means pivotally fastening said supports on said upright ends of said integral mount aligning said openings and holes on said pivotal axis, means defining an adjusting slot in a first of said supports, a fastener received in said slot for adjustably positioning one of said supports on one

of said uprights, a supporting link for adjustably supporting the other of said supports, said link defining a slot,a second fastener for adjustably supporting said other one of the said supports on said supporting link to thereby adjustably mount said belt-driven device in an infinite number of positions for tensioning of the drive belt.

4,023,429
COMBINED BELT GUARD AND GUIDE

John W. Davies, III, Plymouth, Wis., assignor to Gilson Bros. Co., Plymouth, Wis.

Filed Nov. 5, 1975, Ser. No. 629,197
Int. Cl.² F16H *7/12, 7/18, 7/10;* **F16P** *1/00*
U.S. Cl. 74—242.11 R **4 Claims**

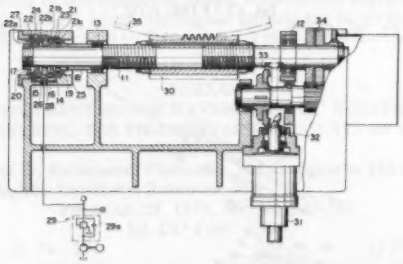


1. In a belt drive comprising a pulley, a belt reeved about the pulley and means for slacking the belt to disengage it from the pulley, the improvement for both guarding and guiding the belt and comprising a shroud enclosing the pulley, said shroud having guide portions narrowly spaced from the edges of the pulley to captivate the slacked belt between the pulley and said shroud portions in the declutched mode.

4,023,430
IMPACT ABSORBING, OVERLOAD PROTECTION APPARATUS FOR MACHINE TOOL

Yoshiaki Imamura, Hiroshima, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 7, 1975, Ser. No. 629,926
Claims priority, application Japan, Nov. 14, 1974, 49-138020[U]
Int. Cl.² F16H *1/02, 35/10*
U.S. Cl. 74—412 TA **5 Claims**



1. An impact absorbing, overload protective apparatus for use in protecting a motor driven rotatable member of a machine tool, the apparatus comprising:

a. a housing having a generally tubular configuration;

b. a piston slidably mounted within the housing the piston being engageable with the rotatable member for effecting said sliding motion of the piston in opposite directions from a predetermined axial position of said piston in said housing in response to undesirable axial forces on the rotatable member

c. bearing structure in which the rotatable member journaled;

d. at least the outer circumferential surface of the piston and the inner circumferential surface of the housing combining to define a pressure chamber having a configuration which varies with said sliding motion of said piston in said housing to absorb the energy of and yieldingly resist said axial forces exerted on said rotatable member tending to displace the piston in either direction from its said predetermined position; and,

d. a power interrupting apparatus including;

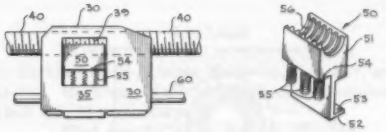
i. a limit switch connected to the motor; and,

ii. an element coupled between the limit switch and the rotatable member, said element being responsive to a predetermined amount of axial displacement of the rotatable member and the piston to actuate the limit switch to stop the motor driving the rotatable member.

4,023,431
SPRING LOADED SPLIT NUT

Garnet L. Pavlas, Houston, Tex., assignor to Bettis Corporation, Houston, Tex.

Filed May 5, 1975, Ser. No. 574,619
Int. Cl.² F16H *1/18*
U.S. Cl. 74—424.8 A **4 Claims**



1. In an actuator having power driven linearly movable piston means for rotating a valve stem, and back-up means for rotating such valve stem, wherein such back-up means includes a rotatable threaded screw, means for coupling said piston means to said valve stem, and means for releasably engaging said screw with said coupling means, the improvement comprising:

means for biasing said engaging means toward a position resulting in screw engagement, said coupling means includes a retainer fixed to said piston means for movement therewith and having an unthreaded passageway therethrough for slidably receiving said screw, said engaging means includes a split nut having a threaded portion engageable with said screw, and said biasing means includes at least one spring.

4,023,432
ACTUATOR HAVING UNIVERSAL-TYPE JOINT ASSEMBLY

Henry R. Killian, Sugarland, Tex., assignor to Keystone International, Inc., Houston, Tex.

Filed Dec. 15, 1975, Ser. No. 640,440
Int. Cl.² F16H *1/18;* **F16D** *3/02, 3/16;* **F16K** *31/44*
U.S. Cl. 74—424.8 VA **22 Claims**

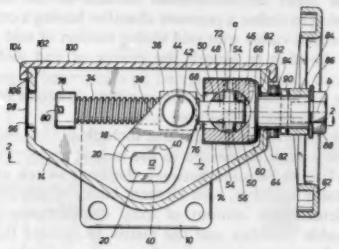
1. An actuator comprising:

a stationary member;

a movable member mounted for movement with respect to said stationary member;

first drive means;

linkage means connecting said first drive means to said stationary member for allowing universal-type movement of said first drive means with respect to said stationary member, said linkage means including a substantially non-torque-absorbing thrust-transmitting element; and



second drive means threadedly connected to said first drive means for relative reciprocation therebetween, said second drive means also being connected to said movable member.

4,023,433

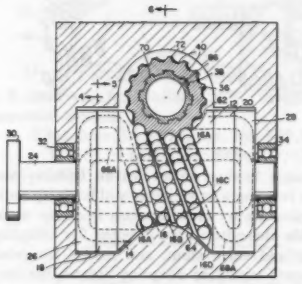
POWER TRANSFER

Ewald Schutz, Lancaster, Pa., assignor to Power Transfer Corporation, Lancaster, Pa.

Filed June 24, 1974, Ser. No. 481,993

Int. Cl.² F16H *1/16, 55/06, 55/04, 55/22*

U.S. Cl. 74—425 **43 Claims**



1. A power transfer unit of the type including a housing, a drive gear shaft rotatable within the housing and a pinion gear shaft rotatable within the housing comprising

A. a drive gear associated with the drive gear shaft,

1. said drive gear being provided with a plurality of continuous power transfer material flow paths,

2. said drive gear terminating laterally in a pair of spaced heads,

3. at least some of the flow paths of the drive gear extending longitudinally the entire length of the drive gear and terminating at each head of the drive gear;

B. a rotatively mounted pinion gear disposed adjacent to said drive gear,

1. said pinion gear including a plurality of grooves in its outer surface, portions of the flow paths in the drive gear being adapted to overlie portions of the grooves of the pinion gear in a power transfer area; and

C. power transfer material in moving engagement with the overlying portions of the flow paths of the drive gear and the grooves of the pinion gear in the power transfer area for transferring rotative power between said drive gear and pinion gear.

4,023,434

STEERING GEAR

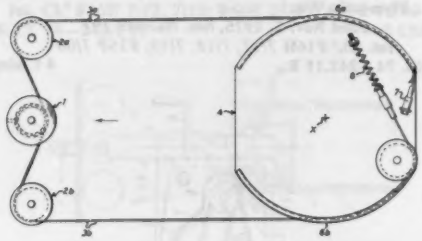
Hans Inge Bengt Axelsson, Tranas, Sweden, assignor to Stiga AB, Tranas, Sweden

Filed June 25, 1975, Ser. No. 590,165

Claims priority, application Sweden, June 26, 1974, 74084518

Int. Cl.² B62D *1/20*

U.S. Cl. 74—496 **4 Claims**



1. A steering gear comprising a body which can be caused to rotate by means of a steering wheel or the like, a pair of elongated flexible means such as bands, wire ropes or chains each having one end wound onto and unwound from said rotary body, and steerable means connected to the opposite ends of the flexible means, wherein the rotary body is formed with circumferential guide means for each of said flexible means, each of said guide means having a width substantially corresponding to the width of the flexible means and a depth permitting at least two turns of the flexible means to be wound therein, and upon winding of said flexible means into the circumferential guide means the turns of the flexible means overlie each other so that the position of an incoming flexible means relative to the axis of rotation of said body is progressively shifted outwardly, while upon unwinding of said flexible means the position of the outgoing flexible means is progressively shifted inwardly towards said axis in order to provide a moment actuating said body in a restoring sense owing to the difference between the effective winding radii of the flexible means actuating the rotary body in opposite directions of rotation.

4,023,435

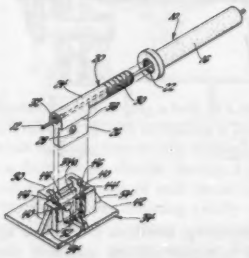
SNAP FIT BOWDEN CABLE ATTACHMENT

Brian J. LaDue, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 380,974, July 20, 1973, abandoned. This application Oct. 18, 1974, Ser. No. 516,102

Int. Cl.² F16C *1/10*

U.S. Cl. 74—501 P **12 Claims**



1. A motion-transmitting remote control assembly for use in a vehicle and adapted to be secured to a support member fixed to the body of the vehicle, said motion-transmitting remote

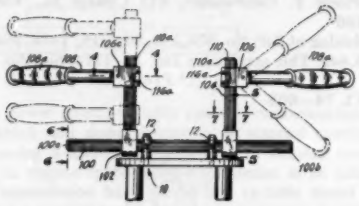
control assembly including a flexible conduit, a flexible motion-transmitting core element movably supported by said conduit with the ends thereof extending from the ends of said conduit, a support fitting secured to one end of said conduit and having a tubular portion encircling one end of said core element out of engagement therewith, and a cable flag extending radially therefrom with intervening shoulders on opposite sides thereof, said support member having wall means extending from one surface thereof defining a socket cavity for said cable flag, one of said cable flag or said wall means including a flexible wall portion having cam and lock means adjacent to a free end thereof defining a protuberance hindering movement of said cable flag into said socket cavity and the other including an abutment portion thereon against which the lock portion of said cam and lock means can engage whereby to releasably lock said cable flag to said support member, with said core element extending substantially parallel to said one surface of said support member.

4,023,436

ARTICULATED HANDLEBARS FOR BICYCLES AND THE LIKE

Peter W. Dodge, 334 E. Ninth St., No. 11, New York, N.Y. 10003

Filed Dec. 29, 1975, Ser. No. 644,716
Int. Cl.² B62K *21/16, 21/12*
U.S. Cl. 74—551.3 **25 Claims**



1. Articulated handlebars for bicycles, motorcycles and the like, which have support means (**10**) thereon for handlebars, the articulated handlebars comprising, in combination: elongated attaching means (**100, 200, 400, 608*g***), including means (**12**) for removably and adjustably fixing said attaching means to said support means; at least one supporting means (**104 . . . 504, 404*c*, 104*a* . . . 504*a*, 404*b*, —*f*, 464*a*, 608*f* . . . *d***) disposed at an angle with respect to said attaching means; at least one handle shaft means (**108 . . . 508, 438, 608*c***) for carrying at its outer end a handle (**108*a***); and first (**102 . . . 302, 502, 614**) and second (**106 . . . 506, 416, 446, 456, 614**) securing means for attaching said supporting means selectively to intermediate and terminal portions of said attaching means, and said handle shaft means selectively to intermediate and end portions of said supporting means, respectively; whereby any spatial, height, length and angular attitude can be set for said handle, as required by the operator of the bicycle and the like.

4,023,437

FILAMENT ROTOR HAVING ELASTIC SHEATHS COVERING THE FILAMENTARY ELEMENTS OF THE STRUCTURE

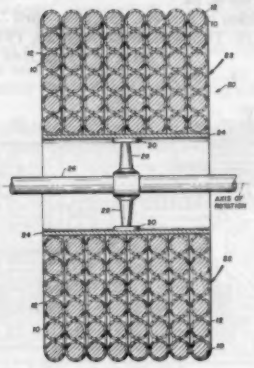
David W. Rabenhorst, Clarksville, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Oct. 24, 1975, Ser. No. 625,582
Int. Cl.² F16C *15/00*
U.S. Cl. 74—572 **13 Claims**

1. An inertial energy storage device for rotation about a shaft comprising, in combination,

rotor means comprised of a plurality of annular rim elements formed of essentially anisotropic material having substantial tensile strength along longitudinal axes thereof; and,

a layer of resilient material formed over full surface areas of the annular rim elements, surface portions of the layer covering adjacent rim elements being deformed toward



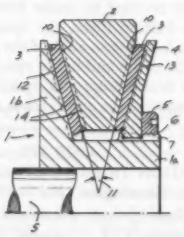
the centers of the rim elements at least prior to rotation of the rotor means.

4,023,438

TORSIONAL VIBRATION DAMPER

Hans Gerhard Birkle, Lindau, Bodensee, Germany, and Josef Krebitz, Horbranz, Austria, assignors to Metzeler Kautschuk AG, Munich, Germany

Filed Apr. 15, 1975, Ser. No. 568,244
Int. Cl.² F16F *15/10*
U.S. Cl. 74—574 **6 Claims**

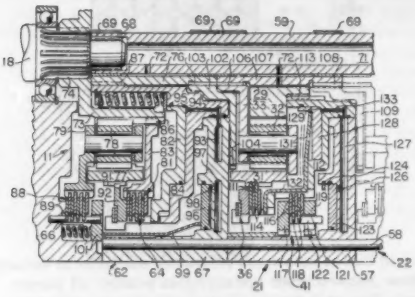


1. A torsional vibration damper for a shaft, particularly for a crankshaft, comprising a hub element adapted to be connected to a shaft and having a first circumferentially extending support surface of axially undulating shape; an inertia element surrounding said hub element and having a circumferentially extending second support surface of axially undulating shape complementary to and juxtaposed with said first surface; an elastomeric member compressed between said surfaces and mounting said inertia element on said hub element and mounting said inertia element on said hub element with freedom of vibration; and means for displacing one of said elements steplessly and axially towards the other element and thereby compressing said member with a steplessly adjustable force for continuously varying the characteristic frequency of vibration of said damper.

4,023,439
MODULAR POWER TRANSMISSION WITH SELF-ENERGIZING DEVICE

Charles H. Herr, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 459,109, April 8, 1974, Pat. No. 3,916,729. This application Aug. 20, 1975, Ser. No. 606,152
Int. Cl.² F16H *3/44*
U.S. Cl. 74—781 R **10 Claims**



1. A friction device within a transmission for selectively conditioning the transmission to transmit torque from an input shaft to an output shaft and for selectively conditioning the transmission to transmit coast torque from the output shaft to the input shaft, the transmission including a pair of elements, at least one of the elements rotatable relative the other and the one element being included in a gear train coupling the input shaft with the output shaft, the friction device comprising

a first friction component being coupled with the one of the elements and including a plurality of friction discs,

a second friction component associated with the other element including a brake drum, a brake reaction disc and a plurality of friction discs mounted on only one of the brake drum and brake reaction disc, the brake drum and brake reaction disc being axially movable relative to each other, the brake drum and brake reaction disc each having projecting tooth means for common enagement with circumferentially spaced apart, spiral teeth formed by means associated with the other element so that said brake drum and said brake reaction disc move axially toward one another to cause frictional engagement between the friction discs, the spaces between the spiral teeth being larger than each of the projecting tooth means on the brake drum and brake reaction disc to assure only one of the brake drum and brake reaction disc being in engagement with the spiral teeth at a given time.

4,023,440
MOTION TRANSMITTING DEVICES

Frank William Kennington, St. Brelade, Jersey, Guernsey (Channel Islands), and Panayotis Constantine Dimitracopoulos, Lyford Cay - Nassau, Bahamas, assignors to Precision Mechanical Developments Ltd., St. Helier, Jersey, Guernsey (Channel Islands)

Filed Aug. 1, 1975, Ser. No. 599,370
Claims priority, application United Kingdom, Aug. 2, 1974, 34127/74
Int. Cl.² F16H *7/06*
U.S. Cl. 74—804 **36 Claims**

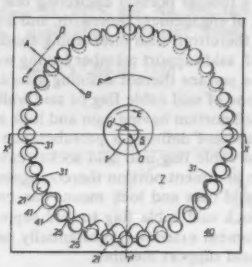
1. A motion transmitting device including:

a. eccentric means,

b. meshing means in the form of a series of linked but individually and independently movable meshing elements,

c. wheel means formed with portions complementary to said meshing elements, and

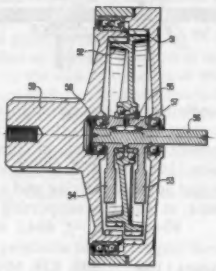
d. a series of individual movement-limiting means, wherein said eccentric means is disposed to cause said meshing elements sequentially and independently to wobble in and out of meshing engagement with successive said complementary portions, each of said individual movement-limiting means guiding in captive dependency always the same individual meshing element within specific limits of wobbling motion, said wobbling motion being in two degrees of freedom relative to each of said individual movement-limiting means.



4,023,441
SPEED REDUCING DEVICE

Jean-Pierre F. Osterwalder, 812 Cottage St., Vienna, Va. 22180

Division of Ser. No. 524,230, Nov. 15, 1974, Pat. No. 3,955,445. This application Jan. 21, 1976, Ser. No. 651,153
Int. Cl.² F16H *1/28*
U.S. Cl. 74—805 **7 Claims**



1. A speed reducing device, comprising: an input shaft; an output transmitting member journaled in axial alignment with said input shaft; an eccentric and a counterweight carried by the input shaft, said eccentric being formed as two sections, said counterweight also being formed as two sections, each counterweight section being formed as an integral unit with a respective eccentric section, the center of gravity of the counterweight lying on a line which extends from the input shaft diametrically opposite to a line from the input shaft to the center of gravity of the eccentric; a primary gear and a secondary gear mounted upon the eccentric for rotation together about said input shaft, said primary gear having a different number of teeth than said secondary gear, the primary and secondary gears being integrally joined with an opening on either side to accommodate one of said counterweight sections; a keyway located in the input shaft between the two sections of the eccentric; a key positioned within the keyway to maintain the sections of the eccentric in alignment; a fixed gear spline in engagement with said primary gear, the primary gear having a smaller number of teeth than the fixed gear spline; said output transmitting member including a rotatable output gear spline in engagement with said secondary gear, the secondary gear having a smaller number of teeth than the output gear spline; a casing secured to said fixed gear spline;

a bearing assembly mounted between said casing and said rotatable output gear spline in a direct straight line with the lines of force transferred by the gear teeth which are in mesh, said output gear spline being in direct engagement with said fixed gear spline through said casing and said bearing assembly, said casing and bearing assembly being located radially outwardly from said secondary gear to thereby achieve a short, compact, stiff torque path which extends from the fixed gear spline through the periphery of the primary and secondary gears to the output gear spline.

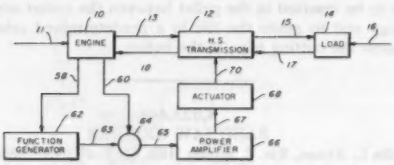
4,023,442
AUTOMATIC CONTROL MEANS FOR INFINITELY VARIABLE TRANSMISSION

Robert L. Woods, Kensington, Md.; Karl N. Reid, Jr., Stillwater, Okla., and Rajamouli Gunda, Rochester, Mich., assignors to Oklahoma State University, Stillwater, Okla.

Continuation of Ser. No. 388,833, Aug. 16, 1973, abandoned. This application July 7, 1975, Ser. No. 593,834

Int. Cl.² B60K *41/16*

U.S. Cl. 74—863 **8 Claims**



1. In a power source-variable speed-transmission-load system in which said power source is an internal combustion engine having a known characteristic of desired manifold vacuum vs. engine speed, said transmission is an infinitely variable transmission having infinitely variable speed ratio, and having a control means for varying said speed ratio, the improvement in automatic control systems for operating said engine at the proper speed for each load to obtain optimum system efficiency, comprising:

a. transducer means to measure engine speed and generate a speed signal;

b. function generator means responsive to said transducer means to convert said speed signal to a signal which is a function of desired manifold vacuum;

c. means to measure actual manifold vacuum;

d. means to compare said desired with said actual manifold vacuum to obtain an error signal;

e. means to amplify said error signal; and

f. means responsive to said amplified error signal to operate said control means on said infinitely variable transmission to vary said speed ratio to reduce said error signal.

4,023,443
TRANSMISSION SYNCHRONIZING MECHANISM

Keizaburo Usui; Eiichi Abe, both of Yokohama, and Kiyotaka Ozaki, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Japan

Continuation-in-part of Ser. No. 424,304, Dec. 13, 1973, abandoned. This application Dec. 16, 1975, Ser. No. 641,353

Claims priority, application Japan, Dec. 15, 1972, 47-125218

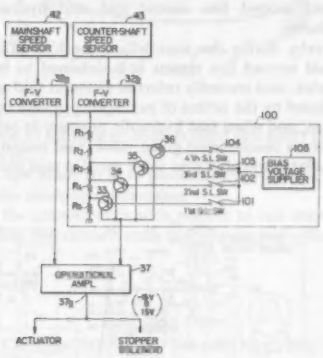
Int. Cl.² B60K *41/18*; F16H *5/60*

U.S. Cl. 74—866 **8 Claims**

1. In a power transmission having a casing rotatably supporting therewithin a main shaft and a countershaft in a parallel relationship, first and second pinions fixedly mounted on said countershaft spaced axially to each other, first and second gears rotatable about said main shaft and meshing with said first and second pinions respectively, a sleeve member axially slidably splined to said main shaft and slidable between said first and second gears, said sleeve member being operative to selectively and releasably fix one of said first and second gears to said main shaft, sleeve actuating means operative for axially moving said sleeve member along said main shaft when a shift lever is manually operated, first means operable for varying the rotation speed of said countershaft, and second means responsive to the rotation speeds of said countershaft and said main shaft to control the operation of said first means, the improvement in that said first means comprises:

a first friction member firmly fixed to said casing adjacent to said main shaft;

a second friction member firmly mounted on said main shaft adjacent to said first friction member; and



a sliding friction member rotatable with said first gear about said main shaft and axially slidable along said main shaft between said first and second friction members, said sliding friction member having at axial opposite ends thereof a pair of outer walls selectively and releasably engageable with one of said first and second friction members to effect a deceleration amnd an acceleration respectively of said countershaft;

said second means is operative to selectively move said sliding friction member into slidable engagement with one of said first and second friction members when the rotational speed of one of said first and second gears is higher and lower respectively than the rotational speed of said main shaft.

4,023,444
PRESSURE CONTROL CIRCUIT FOR USE IN AUTOMATIC TRANSMISSION OF VEHICLE

Noboru Murakami, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed July 17, 1974, Ser. No. 489,369

Claims priority, application Japan, July 25, 1973, 48-83195

Int. Cl.² B60K *41/04*; F16K *31/12*

U.S. Cl. 74—868 **2 Claims**

1. A pressure control circuit for use in an automatic transmission of a vehicle, comprising:

a hydraulic pressure source;

a pressure regulating valve for regulating a hydraulic pressure from said hydraulic pressure source, said pressure regulating valve having a valve spool having portions of different cross-sectional areas, a spring for urging said valve spool in one direction to increase a hydraulic pressure, a discharge port, an input port and an output port, said valve spool being adapted to be shifted in an opposite direction against the said spring acting in said one direction, whereby said discharge port may be opened or closed, and said input port being communicated with said hydraulic pressure source at times;

an actuator in communication with said output port of said pressure regulating valve and adapted to be actuated due

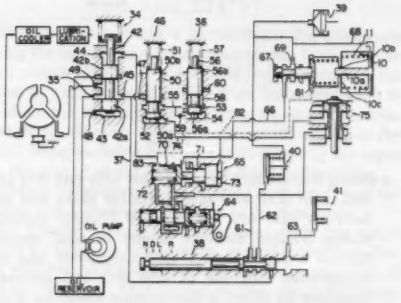
to the hydraulic line pressure regulated by said pressure regulating valve;

a first line means for communicating said hydraulic pressure source with said actuator; an accumulator provided within said pressure regulating valve on said opposite direction with respect to said valve spool, and having a piston, a spring for urging said piston in said opposite direction and a hydraulic pressure chamber positioned on the opposite side of said spring with respect to said piston;

a second line means branched from said first line means and communicating with said hydraulic pressure chamber in said accumulator;

an orifice means located between the branching point of said second line means and said hydraulic pressure source;

whereby during the time which the hydraulic pressure in said second line means is maintained to below a given value, said secondly referred piston in said accumulator is biased by the action of said spring in said opposite direction, and when said hydraulic pressure in said second line means reaches said given value, said piston in said accumulator will abut said valve spool in said pressure regulating valve to thereby mechanically impart an urging force to said piston in said one direction;



a plurality of frictional engaging means operated under said line pressure;

a governor valve for producing a governor pressure which is increased or decreased in response to the speed of said vehicle;

a manual shift valve operably communicated with said regulator means and for supplying said line pressure to said frictional engaging means;

a throttle valve hydraulically communicated with said shift valve for producing a throttle pressure commensurate to an engine torque demand;

a shift valve hydraulically communicated with said manual shift valve and operable in response to the governor pressure and the throttle pressure for automatically and selectively actuating said frictional engaging means by way of said first line means; and

a third line means in said circuit, said throttle pressure being supplied through said third line means to one of said both chambers all the time, thereby imparting a force to said spring to urge the piston of said accumulator in said one direction.

4,023,445

SHEET METAL FILE GUIDE

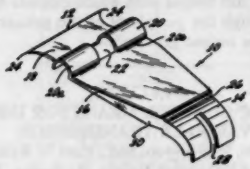
Kay Silvon, Portland, Oreg., assignor to Omark Industries, Inc., Portland, Oreg.

Filed Oct. 1, 1975, Ser. No. 618,480

Int. Cl.² B23D *63/10*; B25F *1/00*

U.S. Cl. 76—36 **5 Claims**

1. A file guide for a saw chain cutting link including a cutter and depth gauge separated by a gullet comprising: a sheet metal plate including first and second spaced flat plate sections lying in a common plane, an intermediate section joining said flat sections and forming a semi-circular loop depending from one side of the plate, said loop having a center portion removed and the remaining end portions forming aligned guide lugs, said first and second flat sections forming a reference plane on said one side of the plate with said first and second flat sections adapted to abut respectively the depth gauge and cutter of the cutting link, said lug portions adapted to straddle a saw chain while providing a guide channel for a file to be inserted in the gullet between the cutter and depth gauge and to guide the file in a predetermined orientation against the cutting edge of the cutter.



4,023,446

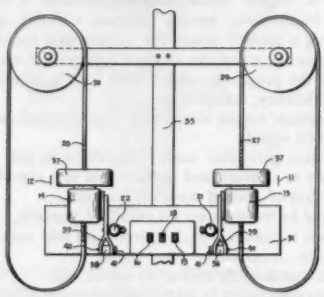
BAND SAW GRINDER

Dulin L. Annas, Rte. 7, Indian Hills, Hickory, N.C. 28601, and Richard M. Teague, Rte. 1, Box 180, Taylorsville, N.C. 28681

Filed July 14, 1975, Ser. No. 595,810

Int. Cl.² B23D *63/12*

U.S. Cl. 76—40 **10 Claims**



8. A band saw blade grinder comprising at least a pair of assemblies each having apparatus for supporting and grinding one of a plurality of band saw blades corresponding in number to the number of said assemblies, and drive means common to said assemblies, said supporting and grinding apparatus of each of said assemblies comprising means for supporting a band saw blade in vertical position such that the two flights of the band saw blade extend vertically, means for clamping a vertically extending portion of one of the band saw blade flights at a location where the band saw blade teeth are ground, means connected to and driven by said drive means for intermittently advancing said blade in a direction to move the blade upwardly through said clamping means and to momentarily position each blade tooth for grinding at said clamping means, a grinding unit including a grinding wheel drive motor and a grinding wheel mounted on the drive shaft of said grinding wheel drive motor to be driven thereby, means mounting said grinding unit with the drive shaft in an upright position, and means connected to and driven by said drive means for cyclically rocking said grinding unit back and forth to momentarily bring said grinding wheel into contact with

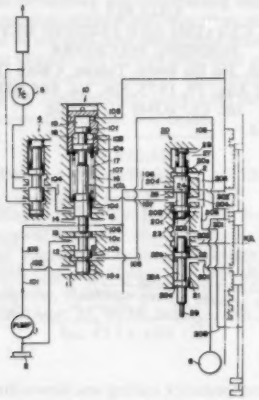
each saw blade tooth as it is advanced into grinding position at said clamping means to sharpen same, the saw blade supporting means of said pair of assemblies being so disposed that the upwardly advancing flights of the supported band saw blades confronting each other, and the grinding units of said pair of assemblies being arranged to sharpen the teeth along the confronting flights of the two blades.

4,023,447

FLUID PRESSURE CONTROL SYSTEM FOR AUTOMATIC POWER TRANSMISSION

Toshimitsu Sakai, 48, Heiwa-cho 4-chome; Kagenori Fukumura, 8, Toyota-cho, and Tadashi Saitou, 6, Ohbaya-shi-cho 8-chome, all of Toyota, Aichi, Japan

Filed Jan. 22, 1975, Ser. No. 543,121
Claims priority, application Japan, Feb. 12, 1974, 49-16295
Int. Cl.² B60K *23/02*
U.S. Cl. 74—869 **16 Claims**



1. An improvement in an automatic transmission for a motor vehicle which includes a fluid pressure control system for selectively actuating a plurality of hydraulically controlled friction elements to establish predetermined speed reduction ratios in a number of different modes of operation, said control system comprising (a) a throttle valve adopted to produce a throttle pressure proportional to the engine throttle opening, (b) a manual valve movable to a number of positions including ranges P (parking), R (reverse), N (neutral), and other positions of a manual range within predetermined transmission ratios, (c) a governor valve for producing a governor pressure proportional to the speed of the vehicle, (d) a number of shift valves for automatically actuating said friction elements in response to throttle opening, vehicle speed and position of said manual valve, (e) pressurized fluid source for producing a line pressure, and (f) passage means for defining a plurality of predetermined fluid passages for interconnecting said valves and said hydraulically actuated friction elements with each other and with said source of pressurized fluid according to the position of said manual valve, wherein the improvement comprises:

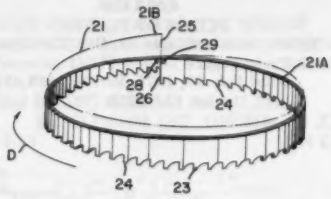
a pressurized regulator valve adapted to regulate said line pressure into a constant detent pressure and to communicate with said shift valves through said manual valve to hold upshifting movements of said shift valves according to the position of said manual valve in said manual range, said shift valves including kickdown passages in communication therewith, said pressure regulator valve being further adapted to communicate with said kickdown passages through said throttle valve to urge downshifts of said shift valves on kickdown.

4,023,448

METHOD OF MAKING A SAW BLADE CONSTRUCTION

Milo Bertini, 679 Garden St., Trumbull, Conn. 06605

Filed Aug. 13, 1975, Ser. No. 604,431
Int. Cl.² B23D *63/00*
U.S. Cl. 76—112 **8 Claims**



1. A method of forming an endless band saw blade comprising the setps of:

forming a saw blade so as to place the opposed ends of the blade into abutting relationship,

offsetting the abutted ends with respect to one another,

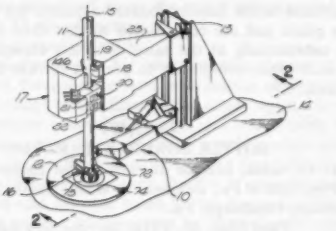
and securing the abutted ends together in said offset relationship.

4,023,449

TOOL FOR CONNECTING AND DISCONNECTING WELL PIPE

George I. Boyadjieff, Anaheim, Calif., assignor to Varco International, Inc., Orange, Calif.

Continuation-in-part of Ser. No. 550,776, Feb. 18, 1975, Pat. No. 3,961,399. This application Apr. 19, 1976, Ser. No. 678,403
Int. Cl.² B25B *17/00*
U.S. Cl. 81—57.16 **17 Claims**



1. A well tool for connecting or disconnecting joints in a pipe string which extends downwardly into a well, comprising:

a spinner for gripping an upper one of two threadedly interconnectible pipes of said string rotating it relative to a lower pipe;

a torque wrench including upper and lower gripping assemblies for gripping said upper and lower pipes respectively, and means for turning one of said assemblies relative to the other to tighten or release the threaded connection between said pipes;

a slip assembly for engaging and supporting said lower pipe and including a plurality of slips having outer tapering surfaces engageable with tapering slip bowl structure to support the pipe therein;

a common suport structure for said spinner, torque wrench and slip assembly to be located at a side of the well;

means mounting said spinner and torque wrench to said support structure for upward and downward movement relative thereto and for movement generally horizontally between active positions about the pipes and retracted positions at a side of the pipes; and

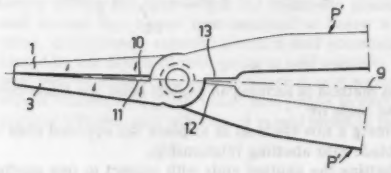
means mounting said slip assembly to said common support structure for movement between an active position about the lower pipe and a retracted position offset to a side of the pipe and for movement upwardly and downwardly relative to said support structure and relative to said spinner and said torque wrench.

4,023,450

PLIERS OF PLASTIC

Goran Ygfors, Smastugevagen 18, Rue Theodore de Banville F-75017, Paris, France

Filed Feb. 19, 1976, Ser. No. 659,401
Int. Cl.² B25B *7/02*
U.S. Cl. 81—418 **5 Claims**



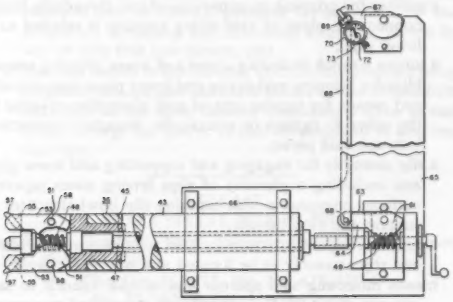
1. Pliers with two lever members comprising plastic material and a pivot means joining the lever members on a pivot axis intermediate their two ends, each lever member having a jaw with clamping surface on one side of the pivot means and a substantially longer and stronger handle on the other side of the pivot means: characterized in that the jaws have an elasticity and size relative to the handle to permit a limited flexing and that the clamping surfaces of said jaws are disposed relative to the pivot axis to enable said jaws upon pivotal motion of the handles in a direction toward each other to make contact first at the outer end portion of the jaw clamping surfaces to thereby, between said clamping surfaces, form an angle diverging toward the pivot means and thereafter, by action of increased clamping pressure on the handles, said jaws successively deflect until said clamping surfaces abut each other completely; and limit shoulders are provided on the portions of the handles located adjacent the pivot means of the pliers and are constructed so that they contact each other substantially at the same time the clamping surfaces abut each other completely to prevent further deflection of said jaws.

4,023,451

BOTTLE BORING APPARATUS

Robert C. Acton, Marple Township, and Lester R. Sunday, Darby, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 30, 1976, Ser. No. 671,849
Int. Cl.² B23B *41/06, 3/28*
U.S. Cl. 82—1.5 **11 Claims**



1. Apparatus for enlarging a portion of an axial bore in a rotor, said apparatus comprising:

means for supporting said rotor and rotating said rotor about its longitudinal axis,

a boring bar, axially aligned with said rotor,

means for moving said boring bar generally rectilinearly back and forth along the axis of said rotor,

said boring bar having a shaft rotatably disposed therein, said shaft having a worm gear disposed adjacent each end thereof and at least one segment of a wheel pivotally mounted in engagement with each of said worm gears, the wheel on one end having a cutting edge mounted thereon and the wheel on the other end having indicating means cooperatively associated therewith so that said indicating means and cutting edge move in unison,

means for rotating said shaft in said boring bar, and

a template representative of the shape of the desired enlargement in said bore of said rotor and disposed a predetermined distance from the desired enlargement,

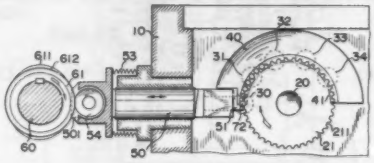
whereby when enlarging said bore in said rotor said indicating means and template cooperate to indicate the position of said cutting edge relative to the desired shape of the enlargement.

4,023,452

FEEDSTOCK CUTTING AND FEEDING DEVICE FOR FORMING MACHINES

Yuan Ho Lee, 85, Jen Ho Road, Tainan, China /Taiwan

Filed Aug. 19, 1975, Ser. No. 605,841
Int. Cl.² B26D *3/16, 7/06*
U.S. Cl. 83—161 **2 Claims**



1. A high-speed feedstock cutting and forwarding device for use with and adaptable to a bolt nut forming machine, said device comprising a cutter for cutting feedstock, said cutter including means for driving said cutter in a reciprocal manner; and a transferring and conveying disc for conveying cut nut blanks away from the cutter, said disc operatively connected to and driven in a rotary motion by suitable driving means and being structurally adapted and provided at a suitable position in relationship to said cutter for receiving nut blanks cut thereby, said device being characterized in that the cutter is driven through a moving distance by said cutter driving means only about one half of the distance through the feedstock to achieve cutting thereof; and means to return the resultant blank the same distance to a suitable position for introduction to the said disc.

4,023,453

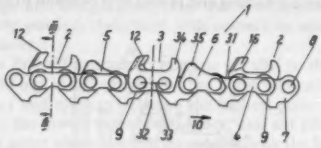
SAW CHAIN FOR MOTOR CHAIN SAWS

Hans Dolata, Neustadt, and Rolf Sauermilch, Waiblingen, both of Germany, assignors to Andreas Stihl Maschinenfabrik, Neustadt, Germany

Division of Ser. No. 328,125, Jan. 30, 1973, Pat. No. 3,921,490. This application Apr. 8, 1975, Ser. No. 566,532
Int. Cl.² B27B *17/02, 33/14*
U.S. Cl. 83—174 **3 Claims**

1. A chain saw comprising in combination a chain having cutting tooth link plates distributed therealong and disposed altenately on opposite sides of the chain, each cutting tooth link having a portion upstanding therefrom toward the outside of the chain generally parallel thereto and bent out of the plane of the respective link so as to diverge from the central

plane of the chain in the longitudinal direction, the said upstanding portions of successive links being inclined forwardly in the cutting direction and forming mirror images of each other, said upstanding portion having an outer edge remote from the chain and a lateral edge which protrudes outwardly from the chain on the respective side of the chain and is disposed at an angle to said outer edge, said outer and lateral edges being joined by a curved transition region, said portion rearwardly of said outer and lateral edges and said transition



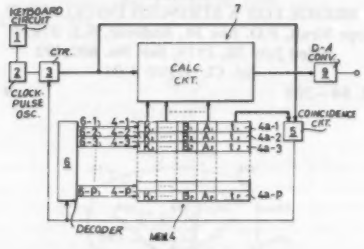
region being relieved to form sharp cutting edges on the leading side of said portion, said outer edge being inclined from said transition region inwardly toward said central plane, said cutting edges permitting post-sharpening thereof automatically during rotation of chain saw operation, said chain having a return bend at one end, and sharpening means having inner radii corresponding to the curved transition region and adjacent said return bend engageable simultaneously with the cutting edges for automatically sharpening said cutting tooth links during operation of the saw chain.

4,023,454

TONE SOURCE APPARATUS FOR AN ELECTRONIC MUSICAL INSTRUMENT

Nobuharu Obayashi; Hikaru Hashizume; Noriji Sakashita; Seiji Kameyama; Sadaaki Ezawa; Toshio Kugisawa; Yutaka Washiyama; Tatsunori Kondo, and Hironori Watanabe, all of Hamamatsu, Japan, assignors to Kabushiki Kaisha Dawai Gakki Seisakusho, Hamamatsu, Japan

Filed Aug. 28, 1975, Ser. No. 608,535
Int. Cl.² G10H *1/00*
U.S. Cl. 84—1.01 **6 Claims**



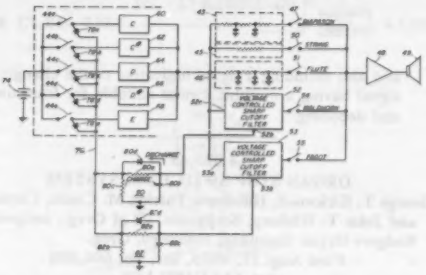
1. A tone source apparatus for an electronic musical instrument, said apparatus comprising a memory circuit which has a plurality of addresses so that, where at least one cycle of a musical tone waveform is divided into p units and a waveform in each section range is repeated by a formula containing the abscissa as its variable, a coefficient and a section range quantum number of each such formula are memorized as digital signals in a corresponding address, said apparatus further comprising a clock pulse oscillator, a counter means coupled to and counting output clock pulses of the clock pulse oscillator, said counter means producing a digital output signal, a coincidence circuit generating a coincidence signal when the digital output signal of the counter means and a digital signal of the section range quantum number memorized in the memory circuit coincide with one another, decoder means designating the next stage address in order in response to output signal of the coincidence circuit, a calculation circuit for calculating a digital output signal from a digital signal from the counter means and a coefficient digital signal from the designated address, and D-A convertor means for converting the digital output signal of the calculation circuit into a corresponding analog signal.

4,023,455

CIRCUIT FOR IMITATING THE SPEECH CHARACTERISTICS OF REED ORGAN PIPES

Richard H. Peterson, 11748 Walnut Ridge Drive, Palos Park, Ill. 60464

Filed Dec. 17, 1975, Ser. No. 641,716
Int. Cl.² G10H *1/02, 5/00*
U.S. Cl. 84—1.21 **14 Claims**



1. In an electronic organ, a circuit for imitating the speech characteristics of reed organ pipes, comprising.

a signal source for producing a plurality of tone signals, one for each note of the musical scale, said tone signals being rich in natural harmonics,

at least one controllable sharp cutoff low-pass filter circuit means connected to said signal source to receive player-selectable signals therefrom, said filter circuit means having a cutoff frequency controllable over a range between a first frequency and a second higher frequency and a rate of roll-off above the cutoff frequency of substantially 24 dB per octave,

a source of control potential,

player-controlled means for selecting desired ones of said tones and for coupling from said source of potential a control voltage to said filter circuit means upon actuation of said player-controlled means, said controllable filter means being operative in response to said control voltage to adjust its cutoff frequency from said first frequency to said second higher frequency, thereby to cause harmonics present in said selected tones having frequencies higher than said second frequency to be abruptly and sharply attenuated, and

transducer means connected to said controllable filter circuit means to receive signals therefrom and to convert the signals to a sound signal.

4,023,456

MUSIC ENCODING AND DECODING APPARATUS

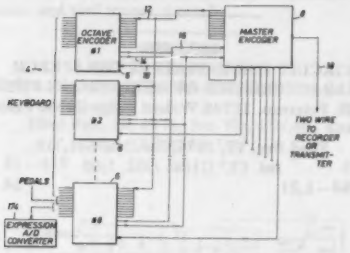
Charles R. Groeschel, 2402 Ansbury, Houston, Tex. 77018

Filed July 5, 1974, Ser. No. 485,983
Int. Cl.² G10F *3/00*; G10G *3/04*
U.S. Cl. 84—115 **19 Claims**

1. Apparatus for forming a representation of playing a music instrument comprising:

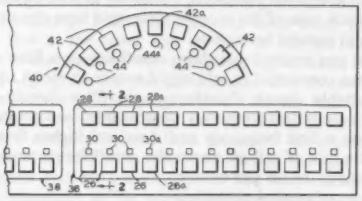
first means responsive to a struck note on a selected portion of an instrument, the instrument being divided into two or more selected portions and therebeing a first means associated with each of the portions of the instrument and said first means scanning a specified number of potential notes in the selected portion of the instrument and forming a signal indicative of a musical change in the selected notes; and,

a master circuit means connected to at least two of said first means for forming an output signal identifying which of said first means has a signal indicative of a musical change



and also including a signal indicative of the change; said signal having a multibit format suitable for transmission and decoding.

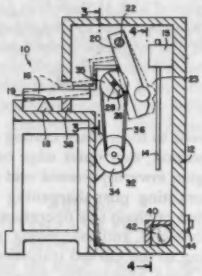
4,023,457
ORGAN STOP SWITCHING SYSTEM
George T. Kirkwood, Hillsboro; Patrick M. Castle, Cornelius, and John T. Whitney, Scappoose, all of Oreg., assignors to Rodgers Organ Company, Hillsboro, Oreg.
Filed Aug. 21, 1975, Ser. No. 606,500
Int. Cl.² G10H *3/06*
U.S. Cl. 84—1.17 **8 Claims**



1. A stop control system for an organ comprising:
a plurality of latching circuits associated respectively with individual organ stops and adapted to energize circuitry for affecting the tonal quality of the organ in accordance with the latching circuit state,
a panel for mounting on an organ console, said panel including a plurality of touch sensitive switches disposed in groups associated with given organ manuals or functions,
said touch sensitive switches being disposed in pairs connected respectively for setting and resetting a corresponding latching circuit for operating each designated organ stop,
and indicating lamps responsive to respective conditions of each of said latching circuits for indicating the state of each latching circuit and corresponding organ stop, wherein an indicating lamp responsive to a given latching circuit is disposed in said panel in proximity to the pair of touch sensitive switches employed for operating the given latching circuit.

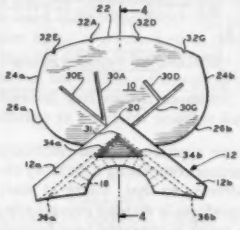
4,023,458
TOY PIANO
Dominic DeCesare, 223 Center St., Elizabeth, N.J. 07202
Filed May 5, 1976, Ser. No. 683,377
Int. Cl.² G10C *3/16*
U.S. Cl. 84—236 **8 Claims**

1. A toy piano comprising:
a frame;
a set of sound-producing elements disposed within said frame and spaced from one another;
a set of hammers pivotably disposed within said frame along a normally horizontal axle for striking said sound-producing elements;
a set of key-shaped levers, each of which have a key-end and a hammer-contacting end, pivotably supported on said frame along a normally horizontal axis parallel to said axle for movement from a first position where said key-end is undepressed to a second position where said key-end is depressed;
means biasing said levers to said first position;
each of said hammers normally resting on one of said lever's hammer-contacting end in said first position to form a gap



between said hammer and one of said sound-producing elements, said hammer being released to move away from said sound-producing element by movement of said lever to said second position;
limit-stop means for each of said released hammers to impinge upon to limit said hammer's movement away from said sound producing element; and
said hammer being pushed by said hammer-contacting end under the force of said biasing means to impinge on said sound-producing element by movement of said lever from said second to said first position.

4,023,459
BRIDGE FOR A STRINGED INSTRUMENT
Carl Hope Strait, P.O. Box 34, Andover, N.J. 07821
Filed July 30, 1975, Ser. No. 600,492
Int. Cl.² G10D *3/04*
U.S. Cl. 84—309 **4 Claims**



1. A bridge for use with a stringed instrument comprising:
a. a solid upper body portion, being generally oval in shape forming two opposed broad faces and a peripheral edge, the upper portion of the edge defining a ridge which is flattened with respect to a pure oval shape and having notches in said ridge for receiving the strings of the instrument;
b. a lower leg portion generally forming an inverted "V" with respect to the body portion, with an apex and two diverging legs having sides extending downwardly and outwardly from said apex in the plane of the body portion, the upper part of said leg portion extending into,

merging with and being attached to said upper body portion, so that when the bridge is mounted on a stringed instrument, the legs will rest on the body of the instrument and support the body portion of the bridge, which will support the strings; said leg portion and body portion in combination presenting a right side and a left side when viewed from a point perpendicular to the plane of the body and leg portions;

c. first, second, third and fourth string receiving notches, numbered from left to right, in the upper portion of the ridge and first, second, third and fourth slits through the body portion, described with respect to said notches as follows:

d. the first slit extending on a line parallel to the side of the right leg, in alignment with the point vertically below said apex and midway between the highest point on the ridge and the lowest extent of the legs, said slit extending from the point where the left leg merges with the body portion, to the point vertically below the first notch;

e. the second slit intersecting with and extending from the end of the first slit at the side of the left leg, to the point vertically below the second notch which is the same distance below the second notch as the point of terminus of the first slit is below the first notch;

f. the fourth slit extending on a line parallel to the side of the left leg in alignment with the point vertically below said apex and midway between the highest point on the ridge and the lowest extent of the legs, said slit extending from the point where the right leg merges with the body portion, to the point vertically below the fourth notch;

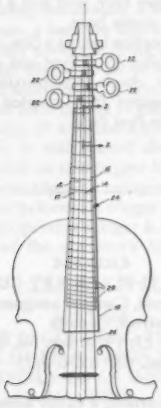
g. the third slit extending on a line parallel to the side of the right leg, from a point which is the same distance vertically below the third notch as the point of terminus of the first slit is below the first notch, to the point where the third slit intersects the fourth slit.

4,023,460

INTONATION AID FOR THE VIOLIN, VIOLA AND CELLO AND OTHER INSTRUMENTS OF THE VIOLIN FAMILY

Horst F. Kuhnke, 9 Echo Court, Hawthorn Woods, Ill. 60047

Filed Apr. 21, 1976, Ser. No. 679,008
Int. Cl.² G10D *3/06*
U.S. Cl. 84—314 **4 Claims**



1. An improved intonation aid for attachment to stringed musical instruments of the type including a fingerboard with a nut at one end thereof, said fingerboard having a convex surface opposed to the strings with a longitudinal axis perpendicular to the plane of the arc defining the convex surface, the strings of said instrument being suspended over the fingerboard, said aid comprising in combination:

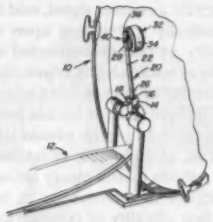
a series of spaced stops positioned on the fingerboard beneath the strings, said stops comprising spaced ridges forming an acute angle with the longitudinal axis, the angle being distinct for each stop and progressively increasing with the distance of the stop from the nut, said stops being positioned beneath said strings at scale positions, the position of intersection for each single stop being closer to the nut for lower strings than for the succeeding higher string so as to accommodate for distinct string tension, thickness, and elasticity for each string and for each separate instrument.

4,023,461

BASS DRUM BEATER

Sandro A. Brandolino, 1801 Lincoln Ave., Joliet, Ill. 60435

Filed Sept. 10, 1975, Ser. No. 611,900
Int. Cl.² G10D *13/00*
U.S. Cl. 84—422 S **4 Claims**



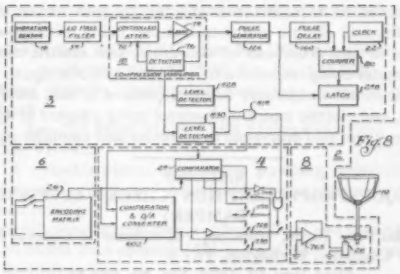
1. A drum beater comprising an elongated bar, one end of said bar being adapted to be removably anchored to an oscillatable hammer block with the other end of said bar projecting outwardly from said block generally radially of its axis of oscillation, the other end of said bar including a terminal end portion, a beater ball, means removably supporting said beater ball from said terminal end portion with said beater ball disposed to one side of said bar, the side of said beater ball remote from said bar being slightly convex spherical and including central portions thereof having shallow recesses formed therein, said means removably supporting said beater ball from said terminal end portion including a threaded connection between said ball and bar defining a central thread axis extending centrally through said ball and at generally right angles to the longitudinal extent of said bar.

4,023,462

MUSICAL INSTRUMENT TUNING DEVICE

Sam Denov, Chicago; Rame W. Bull, Mount Prospect, and Walter Scott Bartky, Northfield, all of Ill., assignors to Sam Denov, Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 643,252
Int. Cl.² G10G *7/02*
U.S. Cl. 84—454 **8 Claims**



1. A drum tuning device for adjusting the tension on a drumhead comprising: a vibration sensor producing a sensor signal responsive to movement of said drumhead; a low-pass harmonic filter, connected to said vibration sensor to receive

said sensor signal, said low-pass harmonic filter being adapted to pass a fundamental signal of said sensor signal; a compression amplifier connected to said low-pass harmonic filter, said compression amplifier being adapted to receive said fundamental signal and normalize said fundamental signal; a square wave amplifier-shaper connected to said compression amplifier to receive said normalized fundamental signal, said wave amplifier-shaper being adapted to convert said normalized filtered signal to a square wave signal; a pulse delay circuit, connected to said square wave amplifier-shaper to receive said square wave signal, said pulse delay circuit producing a reset pulse and a latch pulse timed with a portion of said square wave signal; a crystal controlled clock producing a plurality of clock pulses; a digital counter connected to said crystal controlled clock to receive said clock pulses, said digital counter being connected to said pulse delay circuit to receive said reset pulse, said digital counter being adapted to count said clock pulses and generate a counter signal, said digital counter being adapted periodically to be reset upon receiving said reset pulse; a plurality of latches connected to said digital counter, said plurality of latches being connected to said pulse delay circuit, said plurality of latches being adapted to receive said counter signal, said plurality of latches being adapted to store said counter signal upon receipt of said latch pulse from said pulse delay circuit, said plurality of latches producing a stored count signal; a diode matrix binary encoder producing a digital signal indicative of a frequency to be selected for tuning the drum; a first plurality of comparators, each comparator of said first plurality being connected to a latch, each comparator of said first plurality being connected to said diode matrix binary encoder, each comparator of said first plurality receiving a portion of said stored count signal from said latches, each comparator of said plurality receiving a portion of said digital signal from said diode matrix binary encoder; said first plurality of comparators producing a difference signal indicative of the difference between the stored count signal and the digital signal from said diode matrix binary encoder; a second comparator and digital-to-analog converter connected to said first plurality of comparators, said digital-to-analog converter producing an analog difference signal indicative of the difference between a plurality of low-order bits of said stored count signal and said digital signal from said diode matrix binary encoder; a level detector connected to said compression amplifier, said level detector also being connected to said first plurality of comparators, said level detector receiving a portion of said filtered signal from said low-pass harmonic filter, said level detector producing a level detector signal indicative of an amplitude of said filtered signal; a motor drive amplifier connected to said first plurality of comparators and said second comparator and digital-to-analog converter, said motor drive amplifier being responsive to said difference signal and said analog difference signal, said motor drive amplifier producing an amplified signal; and an electric motor-tachometer connected to said motor drive amplifier,said electric motor-tachometer being drivingly connected to said drumhead of said drum, said electric motor-tachometer being responsive to said level detector signal, said electric motor-tachometer being responsive to said amplifier signal, said electric motor-tachometer being adapted to adjust the tension of said drumhead to minimize said amplifier signal.

4,023,463

LIQUID PROPELLANT GUN (CHECK VALVE AND DAMPER)

Douglas Pray Tassie, Williston, Vt., assignor to General Electric Company, Burlington, Vt.

Filed June 10, 1976, Ser. No. 694,867
Int. Cl.² F41F *1/04*
U.S. Cl. 89—7 **11 Claims**

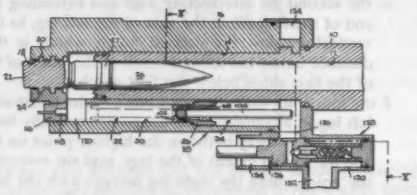
1. A pump comprising:

a cylinder having a longitudinal bore with a longitudinal axis, an inner wall, an inlet end and an outlet end;

a check valve coaxial with said longitudinal axis and closing said cylinder bore inlet end, including:

an outer annular housing fixed to and sealed within said cylinder bore inner wall, and having a longitudinal bore coaxial with said longitudinal axis and a first, substantially transverse, cylinder bore inlet end remote face,

an annular sleeve disposed within said housing bore and having an annular head portion remote from said cylinder bore inlet end, a tail portion provided by a plurality of circumferentially spaced apart beams extending longitudinally from said head portion and proximal to said cylinder bore inlet end; and having a longitudinal bore coaxial with said longitudinal axis,



said sleeve head portion having a first, substantially transverse, cylinder bore inlet end remote face, and a second, substantially transverse, cylinder bore inlet end proximal face, and

spring means biasing said sleeve towards said cylinder bore inlet end so that said sleeve head second face abuts and seals against said housing first face;

a piston having a head portion journaled within and sealing against said cylinder bore wall and a stem portion journaled within said sleeve bore,

said piston head portion having a first, substantially transverse, check valve distal face and a second, substantially transverse, check valve proximal face,

said piston head second face adapted to abut and seal against said sleeve first face.

4,023,464

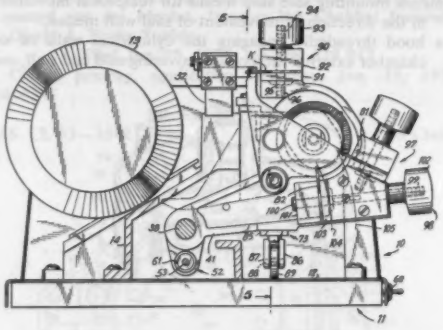
AUTOMATIC MULTI-BLANK KEY CUTTING DEVICE

Alfred B. Zion, Montreal, Canada, assignor to Dominion Lock Company Ltd., Montreal, Canada

Filed June 23, 1976, Ser. No. 698,828
Int. Cl.² B23C *3/35*
U.S. Cl. 90—13.05 **8 Claims**

7. A key cutter comprising a cutter wheel, a stylus member supported in predetermined spaced relation to the periphery of said wheel, a vise assembly including key clamp means, and first and second key blank clamp means, the spacing of said first and second clamp means from said key clamp means corresponding to the spacing of said stylus member from first and second portions on the periphery of said cutter wheel, and feed means for relatively moving said vise assembly and said stylus and cutter to scan a key held in said key clamp means across said stylus and simultaneously and concomitantly move

a pair of key blanks held in said first and second blank clamp means respectively against said first and second spaced portions of said wheel, thereby to duplicate in said blanks the pattern of said key.



4,023,465

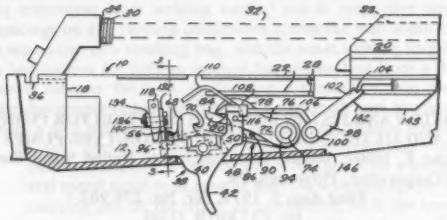
FIREARM

Thomas C. Inskip, 6504 Democracy Blvd., Bethesda, Md. 20034

Filed June 27, 1975, Ser. No. 555,585

Int. Cl.² F41D *11/02*

U.S. Cl. 89—131 9 Claims



1. In a firearm firing mechanism, a trigger movable in first and second directions, a hammer which is moved to a cocked position automatically upon the firing of a round and which cooperates with said trigger so as to be released when said trigger is moved in said first direction, and means operable after said trigger has been moved in said first direction and in response to the firing of a round for rapidly and positively moving said trigger in said second direction against finger pressure being exerted on said trigger by the operator so that finger pressure on said trigger is momentarily opposed whereupon the time period before said trigger is again moved in said first direction by the operator's finger is inversely proportional to the magnitude of the operator's finger pressure on the trigger.

4,023,466

APPARATUS FOR REGULATING THE SPEED OF AND THE PRESSURE OF FLUID UPON THE RAM IN THE INJECTION ASSEMBLY OF AN INJECTION MOLDING MACHINE

Herbert Strassheimer, Bischofsheim, Germany, assignor to GKN Windsor GmbH, Bischofsheim, Germany

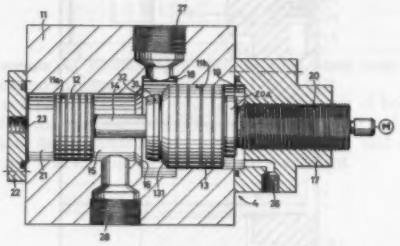
Filed Aug. 7, 1974, Ser. No. 495,525

Claims priority, application Germany, Aug. 8, 1973, 2340096

Int. Cl.² F01B *25/02*

U.S. Cl. 91—6 5 Claims

1. Apparatus for regulating the speed of and the fluid pressure acting upon the ram in the cylinder of an injection molding machine for thermoplastic material wherein the injection cylinder has a chamber for reception of pressurized fluid, comprising a two-way valve including a housing having a bore including a smaller diameter first portion, a larger diameter second portion, and a compartment between said portions, an inlet communicating with said first of said bore portions and an outlet communicating with said compartment, said valve including further a valve member movable in said housing between at least one first position in which said inlet is sealed from said outlet and a plurality of second positions in each of which said valve member allows said fluid to flow from said inlet to said outlet but at a different rate, said valve member including interconnected first and second sections respectively slidable in said first and second portions of said bore and respectively defining with said bore portions first and second chambers to opposite sides of said valve member, said housing further having a conical seat located in said compartment



adjacent said first portion of said bore, said second section of said valve member which is slidable in said second portion of said bore having a conical sealing portion which engages said seat in said first position of said valve member and said sealing portion including a flow regulating device comprising a cylindrical element which is sealingly received in said first portion of said bore in said first position of said valve member, and a conical element rigid with said cylindrical element and defining with said seat a clearance whose size varies in response to movement of said valve member between said plurality of positions; a conduit connecting said outlet with the chamber of said injection cylinder; a source of pressurized hydraulic fluid connected to said inlet; means for selectively feeding and discharging pressurized fluid from said source into and out from said chambers for moving said valve member between said positions thereof; and stop means extending into said second chamber and being movable axially of said housing to thus select the second position of said valve member.

4,023,467

PISTON COMPRESSOR FOR GASEOUS FLUIDS

Helmut Thurner, Schwaberwegen, Germany, assignor to Bayerisches Druckgusswerk Thurner KG, Markt Schwaben, Germany

Division of Ser. No. 433,812, Jan. 16, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 621,020

Claims priority, application Germany, Mar. 6, 1973, 2311048

Int. Cl.² F04B *21/04;* F15B *13/04;* F16J *9/08*

U.S. Cl. 91—422 9 Claims

1. A cylinder piston compressor pumping apparatus for gases operating without lubrication between piston and cylinder comprising

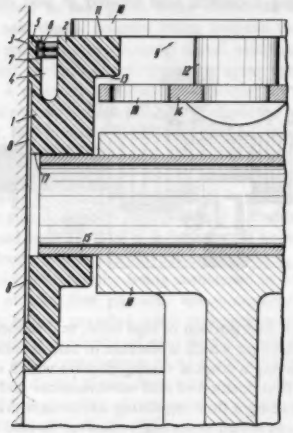
a metal cylinder providing a cylinder head and formed with an outlet duct opening (19) located essentially centrally thereof;

a one piece piston (1) shaped as a cylindrical body and made of polytetrafluorethylene, and formed with a cross bore (17);

a piston pin (15) rotatably located in said cross bore;

a piston rod (16) connected to said piston pin (15);

the one piece piston being further formed with an annular ring groove (4) extending axially from the end face of the piston which faces the cylinder head and located at a distance from the outer wall of the piston which is small with respect to diameter of the piston to leave a projecting sealing lip (5) between the groove and the outer wall of the piston, said ring groove (4) being open to the cylinder head so that, upon compression of gas within the cylinder head, the compressed gas may penetrate in said groove and force the sealing lip against the inner wall (3) of the cylinder to tight sealing pressure between the outer wall of the piston as formed by said lip and the cylinder, the piston being further formed with an axial passage to permit gas flow therethrough;



spring means (6) located in said groove (4) tending to urge said lip (5) outwardly towards the cylinder wall (3) and in continuous engagement therewith;

a gas flow directing valve disk (10) positioned on the end face of said piston and having an outer diameter slightly smaller than the diameter of the groove in the end face of the piston located adjacent said end face (2) of the piston and in abutting relation therewith and axially movable above said end face to direct air flow from the axial passage of the piston around the disk (10) and towards the region of the sealing lip (5) of the piston (1) before being passed to the central outlet duct opening (19) to cool the sealing lip upon reciprocating movement of the piston in the cylinder and means mounting said gas flow directing disk on said piston permitting said axial movement thereof.

4,023,468

BLOOD PUMP STROKE VOLUME LIMITER

Victor L. Poirier, Chelmsford, Mass., assignor to Thermo Electron Corporation, Waltham, Mass.

Filed Jan. 9, 1976, Ser. No. 647,679

Int. Cl.² F01B *19/02;* **F15B** *15/24*

U.S. Cl. 92—13.2 **2 Claims**

1. A pneumatic control device comprising:

a cylindrical chamber;

wall means dividing said chamber into two compartments pneumatically sealed from each other, said wall means being mounted for reciprocal movement along the longitudinal axis of said chamber;

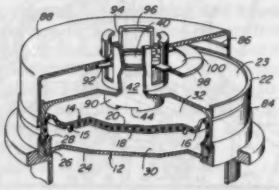
means forming a first port from a first of said compartments;

means forming a second port from a second of said compartments;

stop means extending into one of said compartments from an end wall of said chamber opposite said wall means for limiting reciprocal movements of said wall means;

means mounting said stop means for reciprocal movement in the direction of movement of said wall means;

a hood threadedly engaging the cylindrical walls of sid chamber external thereof and covering said end wall; and



means connecting said hood and said stop means for advancing and retracting said stop means with respect to said wall means upon rotary movement of said hood and for permitting said hood to rotate relative to said stop means to prevent transmission of rotational forces to said wall means.

4,023,469

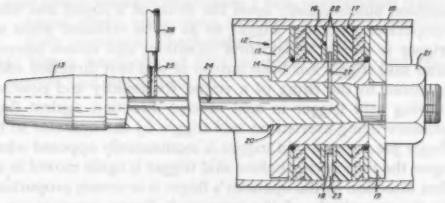
PISTON AND PISTON ROD CONSTRUCTION FOR PUMPS AND METHOD OF FLUSHING PISTON-TYPE PUMPS

John E. Miller, Dallas, Tex., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Aug. 9, 1972, Ser. No. 278,902

Int. Cl.² F01B *31/00*

U.S. Cl. 92—86.5 **4 Claims**



1. In a double-acting reciprocating pump, which includes a cylinder liner, a piston within said liner, and a piston rod attached to said piston;

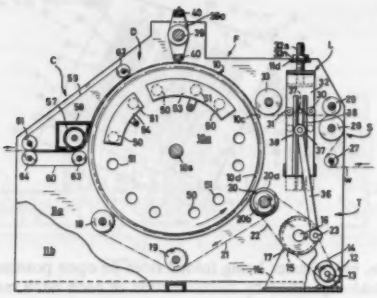
said piston including a body mounted on said rod, first and second rubbers and a spacer therebetween mounted on said body, and a follower mounted on said rod, said rubbers having confronting lips directed toward each other with an annular space therebetween, said rubbers alternating as the working and idle rubber during operation of the pump with the working rubber trailing the idle rubber; and

means connected with said piston rod for continuously introducing flushing fluid under a pressure greater than the discharge pressure of the pump to said annular space where it is effective to wash particles from the surface of said liner in front of the working rubber.

4,023,470
METHOD AND APPARATUS FOR CONTINUOUS PRODUCTION OF BAGS FROM THERMOPLASTIC FILM

Leonard van der Meulen, Impasse Ibn Chabbat Immeuble Djerid A, Tunis, Tunisia

Filed Jan. 10, 1975, Ser. No. 539,943
Claims priority, application Germany, Jan. 19, 1974, 2404545
Int. Cl.² B31B *23/00*
U.S. Cl. 93—35 R 18 Claims



1. In a method for continuous production of bags from thermoplastic synthetic film in the form of a continuous longitudinally advanced two-layer web with the film layers continuously joined along at least one longitudinal edge of the web, from the leading end of which web bags are successively made by transverse seam welding carried out at respective equal spacings on and running continuous across the web width and a separation of a resulting bag, with the seam welding forming a bag bottom for bottom seamed bag production from a flattened tube as the web, or forming a respective side seam simultaneously in two successive side-seamed bags produced from a web with layers unjoined on one longitudinal edge,

the said film web being fed tangentially onto the outer circumference of a welding drum rotating with a peripheral speed equal to or greater than the web feed speed, for carrying out on the drum circumference both the transverse seam welding over its entire width, and as well a web severance into successive bags, the important comprising:

drawing the film web taut on the welding drum as each length portion corresponding to a bag to be produced is being drawn onto the drum,

by displacing the film web being fed to the drum, in a region near to the place where the web is fed onto the drum, in a direction perpendicular to the plane of the web to form a tensioned loop, and

shortly before the welding is effected, releasing the loop thereby to release tension in the film web portion about to be welded.

4,023,471
APPARATUS FOR ASSEMBLING A CARTON

Thomas B. Royal, Homestead, Fla., assignor to International Paper Company, New York, N.Y.

Filed Apr. 24, 1975, Ser. No. 571,075
Int. Cl.² B31B *17/26*
U.S. Cl. 93—39 R 3 Claims

1. A machine for forming a carton from a body forming blank which is scored to define a bottom panel and side panels, and a pair of end forming blanks each of which is scored to define an end panel, said flaps and a bottom flap, said machine comprising:

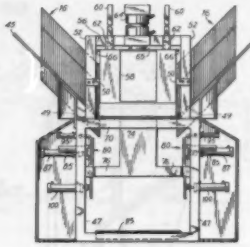
a. a frame;

b. means mounted on said frame defining a carton forming cavity which includes side panel folding means;

c. a mandrel reciprocably mounted on said frame for movement into and out of said carton forming cavity;

d. means mounted adjacent the sides of said carton forming cavity of storing end forming blanks;

e. means for feeding a pair of end forming blanks into said carton forming cavity;



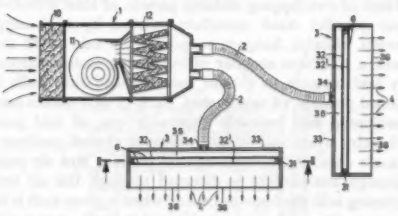
f. means for positioning a body forming blank over said carton forming cavity; and

g. two pairs of side flap folding arms and a pair of bottom flap folding arms for folding said side flaps and said bottom flaps against a body forming blank when said mandrel is at the end of its downward movement.

4,023,472
APPARATUS FOR PRODUCING A LAMINAR FLOW

Hans Grunder, Rheinfelden, and Walter Setz, Gipf-Oberfrick, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 476,171, June 4, 1974, abandoned. This application May 27, 1975, Ser. No. 581,076
Int. Cl.² F24F *13/06*
U.S. Cl. 98—40 D 10 Claims

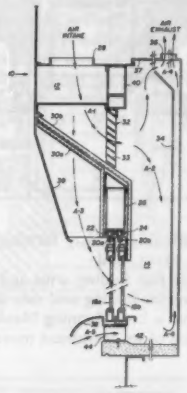


1. An apparatus for producing a displacement flow substantially free from turbulence, comprising a blower having an exhaust; at least one air distributor comprising an open frame-like housing which is provided with an inlet and with an open side which constitutes an outlet; conduit means connecting the exhaust of said blower to the inlet of said air distributor; a steadying means positioned within said housing between the inlet and the outlet and extending across the outlet so that air traveling from the inlet to the outlet passes through said steadying means, the steadying means comprising at least two parallel, spaced apart mesh screens extending across the outlet and having mesh openings of from about 0.005 to 1.0 mm with the spacing between any two adjacent mesh screens being from about 0.2 to 5 cm; and a buffer zone within said housing upstream of said steadying means and defined by that portion of the housing between the first mesh screen encountered by the air flow and said inlet, the ratio between the volume of the buffer zone and its cross-sectional area parallel to the outlet being smaller than $\frac{1}{2}\sqrt{A}$, wherein A denotes said cross-sectional area.

4,023,473
FUME HOOD

Walter Russell, West Islip, N.Y., assignor to Laboratory Furniture, Inc., Carle Place, N.Y.

Filed May 6, 1976, Ser. No. 683,918
Int. Cl.² F23J 11/00
U.S. Cl. 98—115 LH 7 Claims



1. A fume hood comprising:

a bottom counter, a pair of opposed side walls extending upwardly from said bottom counter and a rear wall extending between said side walls upwardly from said bottom counter, a ceiling member extending between said side walls and said rear wall, and an air exhaust means, support means extending between said side walls and spaced from said ceiling member to provide an air intake opening, an air intake plenum positioned opposite the air intake openings, said plenum having a bottom wall comprised of overlapping slidable panels, at least a front and rear parallel track members carried by said support means, slidable hangers supported by said track members, a sufficient number of by-passing sashes supported by said hangers to extend between said side walls in a closed position of said sashes, each of said sashes having associated and movable therewith one of said panels, whereby when said sashes are in a closed position the panels close the bottom of said plenum and air passing through the plenum is directed through the air intake opening into the fume hood and when a given sash is in an open position, its associated panel is in an open position whereby air from the plenum is diverted through the resultant opening in the bottom of the plenum and into the hood through the opening formed by the given open position sash.

4,023,474
CAMPING TOASTER

Robert C. Dixon, 128 Colorado Ave., Idaho Springs, Colo. 80452

Filed Jan. 8, 1976, Ser. No. 647,585
Int. Cl.² A47J 37/08
U.S. Cl. 99—393 4 Claims

1. A collapsible toaster for use over an open burner, constituting a flat package in its folded position, and a tent-shaped unit in its open position and comprising:

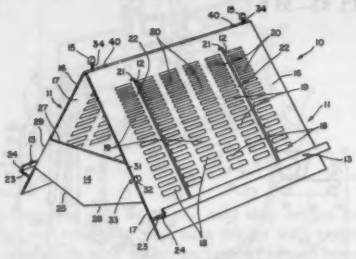
a. a pair of rectangular toasting plates with each having a top edge, a bottom edge and side edges;

b. a plate hinge means joining the top edges of the toasting plates, to permit the plates to swing from the folded position to the open position;

c. a heat shield at each end of the toaster to partially enclose the toaster when at the open position, with each shield having oblique side edges to join the adjacent side edges of the toaster plates at the open position;

d. a heat shield hinge means joining one side edge of each heat shield with the adjacent side edge of one toaster plate;

e. a latch means joining the other side edge of each heat shield with the adjacent side edge of the other toaster



plate, said toaster being folded from its open position to its folded position by disconnection of each latch means to permit each heat shield to be folded at its heat shield hinge means against a toaster plate and the toaster plates to be folded together;

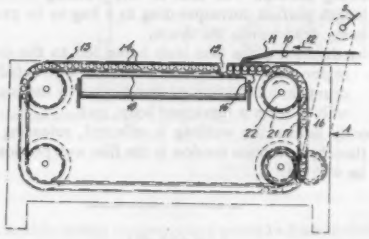
f. heat release orifices in the face of the toasting plates; and

g. a grid means at the face of the toasting plates to hold a piece of toast a short distance from the toasting plates.

4,023,475
DOUGH LAMINATORS

Michael John Mercer, Newton-le-Willows, and Stanley William Crispe, Huyton, both of England, assignors to Simon Vacars Limited, England

Filed Nov. 14, 1975, Ser. No. 632,008
Claims priority, application United Kingdom, Dec. 7, 1974, 53042/74
Int. Cl.² A21C 9/08
U.S. Cl. 99—450.1 16 Claims



1. A device for forming a laminate of, for example, dough sheets, comprising sheet receiving means upon which separate sheets of dough are to be deposited to form said laminate, sheet delivery means for supplying said dough sheets thereto, and a transfer conveyor movable to collect said sheets successively from said delivery means and to transfer same onto said receiving means, said transfer conveyor comprising an endless series of spaced conveying devices movable successively over said receiving means to carry individual sheets from said delivery means and to deposit same onto said receiving means, there being first drive means for advancing said series continuously in one direction to collect and carry said dough sheets, and second drive means for additionally driving the conveying

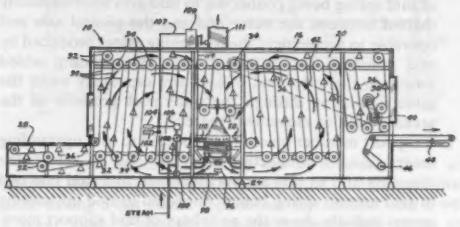
surface of each device of said series to discharge a dough sheet therefrom onto said receiving means.

4,023,476

DOUGH PROOFING MACHINE

Ralph D. Burgess, Jr., Minneapolis, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Continuation of Ser. No. 461,045, April 15, 1974, abandoned.
This application Nov. 7, 1975, Ser. No. 629,945
Int. Cl.² A21B 1/26
U.S. Cl. 99—468 5 Claims



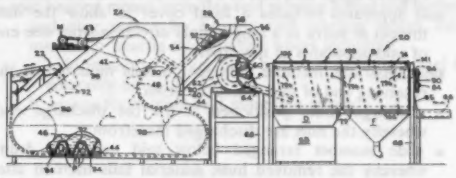
1. A dough proofing apparatus comprising an elongated housing having inlet and oulet openings at the respective ends thereof, two spaced apart side walls and spaced apart top and bottom walls to define a proofing chamber that extends from the inlet to the outlet opening, an endless conveyor extending through the housing from the inlet opening to the outlet opening, the conveyor including a multiplicity of runs entrained over a plurality of laterally spaced pairs of sprockets mounted upon longitudinally and vertically spaced shafts within the housing to carry said dough along a tortuous path through the apparatus from the inlet opening to the outlet opening, two baffles dividing said chamber within the housing into three compartments, the compartments comprising a left compartment adjacent to and communicating with the outlet opening, a right compartment adjacent to and communicating with the inlet opening and a substantially centrally located compartment between the right and left compartments, said baffles comprising two transversely extending vertical and lonitudinally spaced apart baffle plates, the upper and lower ends of the baffle places being spaced from said top and bottom walls of the housing and defining a plenum therebetween, said plenum communicating at its forward and rearward ends with said left and right compartments, a heater in the centrally located compartment and a means mounted within the centrally located compartment to add moisture to the air, humidity sensor provided in said proofing apparatus, air valve means opening through the housing to the atmosphere outside of the housing, said air valve means being operatively connected to the humidity sensor for increasing the amount of outside air introduced from the atmosphere and the inside air exhausted to the atmosphere when the humidity reaches a predetermined upper level, a temperature sensor means mounted within the housing operatively connected to the heater for controlling the temperature thereof, a blower in the centrally located compartment to blow the air in the left compartment on a circular path across the top thereof, vertically through the centrally located compartment, across the bottom in the opposite direction and vertically adjacent to the outlet opening and blow the air in the right compartment on a circular path but in opposite direction as seen from the same side of the housing so as to proceed across the top of the right compartment, vertically adjacent the inlet opening, across the bottom in the opposite direction and vertically through the center compartment, whereby all air flow is entirely within the confines of the chamber to maintain substantially uniform and symetrical conditions of humidity and balanced temperature throughout the housing.

4,023,477

FLEXIBLE CABLE DRY PEELER WITH RUBBER-LIKE CORDS

Katsuji Hirahara, Santa Clara, and John R. Webber, Jr., San Jose, both of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Sept. 29, 1975, Ser. No. 617,877
Int. Cl.² A23N 7/00; A47J 17/00
U.S. Cl. 99—585 10 Claims



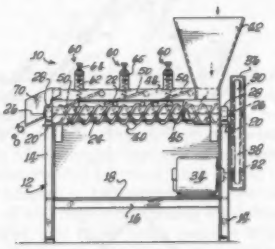
1. In an abrading peeler for fruit which has been pre-treated to soften the skin of the fruit, said peeler being of the type comprising a rotatable cage wherein the fruit is tumbled to abrade and remove the skins; and means for rotating said cage; the improvement comprising a driven shaft for rotating the cage, a continuous helical screw for advancing fruit along the cage, said screw, including an external flange, said flange being provided with a circumferential series of spaced transverse apertures, spoke means mounting said helical screw to said driven shaft, a plurality of resilient, tensioned, rubber-like cords extending longitudinally of said screw for peeling the fruit, means for anchoring the ends of each cord in the apertures of spaced convolutions of said screw, and means for feeding fruit into and from the tumbling cage defined by said screw and said cables.

4,023,478

NUT HUSKING APPARATUS

Paul W. Shaw, 215 West Road, Whittier, Calif. 90603

Filed Aug. 18, 1975, Ser. No. 605,737
Int. Cl.² A23N 7/00
U.S. Cl. 99—628 2 Claims



1. A nut-husking apparatus comprising:
a support structure;
a rotatble conveyor means operably mounted to said support structure;
a drive means operably connected to said conveyor means, whereby nuts disposed thereon are transported from one end of said apparatus to the other;
a stationary wall member longitudinally disposed along the length of said conveyor means whereby a predetermined space is formed therebetween and wherein said nuts being husked are agitated therein;
a plurality of husk-removing means mounted to said stationary wall and positioned for direct engagement with said nuts as said nuts are transported by said conveyor means;
said rotatable conveyor means comprises an elongated, cylindrical drum;

at least one spiraled rib member affixed to the peripheral surface of said drum;

said husk-removing means comprises an elongated finger movably attached to said stationary wall and formed to have a free end portion thereof disposed in said predetermined space between said wall and said drum;

a plurality of serrations arranged on one surface of said finger for removal of said husk from said nut; and

biasing means mounted to each of said fingers, whereby said fingers engage said nuts in a positive, continuous manner;

said apparatus includes a fixed cover to allow the nuts therein to move in a longitudinal direction from one end of said apparatus to the other;

said apparatus includes a hopper means mounted at the receiving end of said conveyor drum;

a discharge chute positioned at the the discharge end, whereby the nuts are discharged therefrom;

a slide member arranged below said conveyor drum, whereby the removed husk material falls thereon after passing through said predetermined space between said drum and said wall thereof;

a pair of ribs are seamed to the peripheral surface of said conveyor drum in a convoluted arrangement; and

said convolutions of said ribs are arranged having an approximate pitch of 60° relative to the longitudinal axis of said drum.

4,023,479

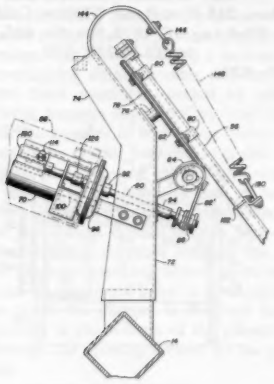
TWINE WRAPPER WITH SPRING SUPPLEMENT FOR ROUND BALES

Ronald L. McAllister, and John H. Freimuth, both of New Holland, Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed June 17, 1976, Ser. No. 697,286

Int. Cl.² B65B *13/18*

U.S. Cl. 100—5 **2 Claims**



1. A bale forming machine for forming round bales and wrapping binding twine around the bales prior to discharging them from the machine and comprising;

a. a mobile frame having a forward end adapted to be connected to and propelled by a tractor over a swath of crop material.

b. means on said frame to form a round bale by coiling said swath about a horizontal axis, and discharging a formed round bale from said frame,

c. means on said frame to supply a continuous strand of binding twine,

d. upstanding means adjacent the forward end of said frame,

e. a twine directing arm adapted to receive twine from said supply means and pivotally connected adjacent one end thereof to the upper portion of said upstanding means for discharge of twine from the opposite outer end of said arm, and

f. power means interconnected to the pivoted end of said arm and operable to oscillate said outer end of said arm through an arc downwardly and upwardly between opposite sides of said frame to effect winding and roving of the twine around a round bale spirally between the opposite ends of said bale and impose tension upon said twine during said winding and roving thereof; in combination with:

g. auxiliary tension spring means, connected at one end to said upstanding means on said frame and the opposite end of said spring being connected to said arm intermediately thereof between the outer end and the pivotal axis and operable to supplement the tensioning effect produced by said power means upon said arm by providing added torque to the outer end of said arm especially when the same is moving through the outermost portions of the arcuate path of movement thereof,

h. a support member pivotally connected to said upstanding means, means connecting said one end of said twine directing arm to said support member, and said one end of said tension spring being connected to said upstanding means radially above the periphery of said support member.

i. a bracket connected to the upper end of said upstanding means radially beyond said support member and having a portion offset laterally toward a bale in said machine beyond the lane of said support member, and means connecting said one end of said spring to said offset portion of said bracket to effect clearance for said twine directing arm relative to said spring.

4,023,480

APPARATUS FOR CONTROLLING A DEFLECTION COMPENSATING PRESS ROLL OF A ROLLING MILL

Mario Biondetti, Schio, Italy, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Feb. 26, 1976, Ser. No. 661,566

Claims priority, application Switzerland, Mar. 4, 1975, 2733/75

Int. Cl.² B30B *15/14, 3/04*

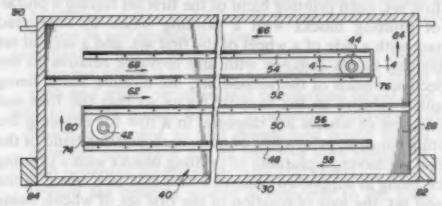
U.S. Cl. 100—47 **20 Claims**

1. An apparatus for controlling a deflection compensating press roll having a support core, a roll shell rotatably mounted about the support core, bearing means disposed between the shell and the core adjacent the shell ends, a plurality of support devices engaged between the core and the roll shell to exert forces therebetween, and pressure means for exerting forces on the core which oppose the forces exerted by said support devices, said control apparatus comprising a frame, a movable member disposed in said frame, means coupled with said support devices and said pressure means and responsive to the forces exerted thereby for exerting forces on said movable member which simulate the forces exerted by said support devices and said pressure means so that said movable member is maintained in a position of equilibrium when said forces exerted by said support devices and said pressure means are substantially in equilibrium, means for sensing displacement of said movable member from said equilibrium position, and means responsive to said sensing means for restoring the forces exerted by said support devices and said pressure means substantially to equilibrium so that loading of said bearing means is substantially minimized.

4,023,481
DOUBLE FACER PLATEN

Thomas R. Keeny, Lindenwold, N.J., assignor to Molins Machine Company, Inc., Cherry Hill, N.J.

Filed Sept. 17, 1975, Ser. No. 614,050
Int. Cl.² B30B 15/34
U.S. Cl. 100—93 P 13 Claims

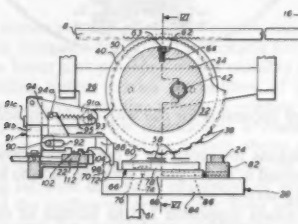


1. A heat transfer platen for use in a double facer and adapted for receiving a heat transfer liquid comprising a main plate having a flat planar top surface for contact with a web, a lower plate, a peripheral spacer between said plates and defining the periphery of a sealed chamber between said plates for receiving the heat transfer liquid, said chamber having an inlet and an outlet, said inlet being closer to an upstream portion of said plates than said outlet, a beam means connected to said lower plate to maintain the plates rigid, means in said chamber defining a continuous labyrinthine passage for flow of the heat transfer liquid between said inlet and outlet, said passage definded by a plurality of interconnected straight parallel dividers with flow through adjacent portions of said passage being in opposite directions, the distance between successive parallel dividers decreasing whereby the velocity of the heat transfer liquid flowing in said passage portions progressively increases.

4,023,482
PRINTING OF AUTOMATICALLY READABLE CHARACTERS

Robert W. Swett, Smoke Rise, N.J.; Amnon Goldstein, Manhasset, N.Y.; Edward C. Marshall, Upper Montclair, and Paul E. Stanford, Clifton, both of N.J., assignors to Litton Business Systems, Inc., Belleville, N.J.

Filed Sept. 23, 1974, Ser. No. 508,677
Int. Cl.² B44B 5/00
U.S. Cl. 101—19 20 Claims



1. A machine for printing on record materal human readable characters which are specially configured so as to also be capable of being read by character recognition apparatus, said machine comprising:

printing mechanism including printing means, said printing means comprising at least one printing wheel;

mounting means on which said printing wheel is rotatably mounted;

said printing wheel being provided on its rim with a plurality of different individual type faces each of which is specially configured to print a different one of said specially configured characters, any desired one of said type faces being selectable for printing;

means for selecting any desired one of said type faces for printing;

means for providing a supply of heat activatable printing ink means for said printing wheel;

means for heating said heat activatable ink means to enable said printing wheel to print said specially configured characters from said heat activatable ink means;

said heating means including said printing wheel and further including means for heating said printing wheel, said means for heartig said printing wheel including:

a. said mounting means on which said printing wheel is rotatably mounted; and

b. means for heating said mounting means.

4,023,483
TYPE FINGER IMPROVEMENT

Harry R. Berrey, Waynesboro, Va., assignor to General Electric Company, Waynesboro, Va.

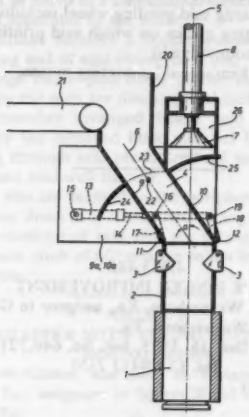
Filed Dec. 15, 1975, Ser. No. 640,721
Int. Cl.² B41J 1/20
U.S. Cl. 101—111 3 Claims

1. A type face carrying finger for use in an elastic belt type carrier which moves the finger across a record medium for impact printing thereon wherein the elastic belt comprises a plurality of slots extending through the width of said belt transversely of the longitudinal axis of said belt and spaced to precise predetermined locations, each of said type face carrying fingers adapted to be supported in respective ones of said slots, each of said fingers comprising a substantially flat elongated member, said finger being resilient in a direction substantially orthogonal to the longitudinal axis of said belt and bearing a type face on a flat surface at one end thereof, each of said type fingers comprising a first shoulder extending in the width direction of the finger and dimensioned to abut the one edge surface of said belt nearest said type face for fixing the finger with respect to said one edge surface of said belt and a pair of shoulders spaced from said first shoulder by substantially the width of said belt and extending in both directions in the width direction of the finger and dimensioned to abut the other edge surface of said belt for facilitating the insertion and removal of said type finger and to secure said finger in said belt between said first and second shoulders, means for minimizing breakage of said fingers due to stresses developed along the width direction of said fingers in the vicinity of said one edge surface of said belt due to pinching of the finger at its one end against the record medium during impact printing comprising locating said first shoulder on said finger only where the concentration of stresses developed at said shoulder are compressive and not tensile.

4,023,484
BALING PRESS

Anton Schafer, Langenfeld, and Karl Probst, Solingen, both of Germany, assignors to Lindemann Maschinenfabrik GmbH, Dusseldorf, Germany

Filed May 11, 1976, Ser. No. 685,189
Claims priority, application Germany, May 30, 1975, 2523969
Int. Cl.² B30B 15/30
U.S. Cl. 100—215 5 Claims

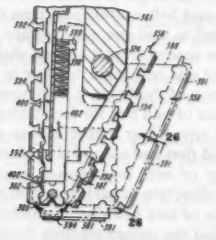


1. In a baling press comprising a press box with a filler box located above it, a plunger for moving material to be baled out of said filler box into said press box, and retaining fingers which prevent said material moved by said plunger from returning the improvement wherein said filler box comprises two opposite fixed walls, two opposite hinged walls located between said fixed walls and capable of pivoting through a small angle relative to the axis of said press box when said plunger is withdrawn, and hinges attached to said hinged walls, the axes of said hinges being fixed and extending transversely to said axis of said press box, whereby said press is filled through said filler box with its hinged walls inclined to said axis of said press box, and then with said hinged walls of said filler box aligned with said press box said plunger moves said material from said filler box into said press box.

4,023,485
PRINTING APPARATUS

Raymond L. Kirby, Jr., Vandalia, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 215,783, Jan. 6, 1972, Pat. No. 3,832,943.
This application July 5, 1973, Ser. No. 376,669
Int. Cl.² B41J 1/20
U.S. Cl. 101—111 10 Claims

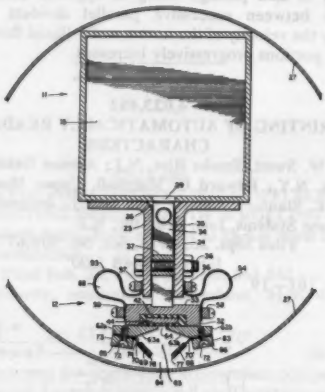


1. A print head, comprising: a support assembly including a support frame, a first set of wheels rotatably mounted by the support frame, each wheel of the first set having a plurality of sides which are relatively long in its rotational plane, a support assembly module mounted by the support frame, the support assembly module including a module frame, a second set of wheels rotatably mounted by the module frame, each wheel of the second set having a plurality of sides which are relatively short in its rotational plane, a first set of printing bands engaged with and movable relative to the respective wheels of the first set, each printing band of the first set having a plurality of printing blocks with a printing block in supported contact with a side of a wheel of the first set, and a second set of printing bands engaged with and movable relative to the respective wheels of the second set, the module frame being mounted relative to the support frame so that the first and second sets of wheels are disposed in a row for enabling the printing bands to print a line of data, each printing band of the second set having a plurality of printing blocks with a printing block being in supported contact with a side of a wheel of the second set, the axis of rotation of the first set of wheels being parallel to the axis of rotation of the second set of wheels, the printing blocks of the first and second printing band which are in supported contact with the respective first and second wheels being disposed in a common plane.

4,023,486
SCREEN PRINTING SQUEEGEE APPARATUS

Herbert W. Linthicum, Atlanta, and George B. Vogeleer, Doraville, both of Ga., assignors to E.T. Barwick Industries, Atlanta, Ga.

Filed Aug. 1, 1974, Ser. No. 493,676
Int. Cl.² B41F 15/42
U.S. Cl. 101—120 9 Claims



9. Squeegee apparatus for use with a printing screen, comprising:
reservoir means for receiving a pressurized flow of liquid and mounted in fixed spaced apart relation to a surface of a printing screen; and
squeegee means supported by the surface of the printing screen and operative to apply liquid to a closed area of such printing screen;
means interconnecting said squeegee means to said reservoir means for a limited range of movement relative to said reservoir means, so that the squeegee means can freely move along said path throughout said range of movement to remain in contact with the screen surface notwithstanding variations in spacing between the screen surface and said reservoir means within said range of movement;
said reservoir means and said squeegee means each having an elongated extent;
said squeegee means including seal means which sealingly

contacts such screen surface and defines the closed area of the screen surface;

flow means defining a liquid flow path from said reservoir means to said squeegee means for application on said closed area defined on the screen surface;

flexible liquid imperivous means externally surrounding the connection between said squeegee means and said reservoir means and extending in liquid sealing relation between said reservoir means and said squeegee means so as to partially define said liquid flow path from said reservoir means to sad squeegee means;

said flexible liquid impervious means partially defining a chamber which is in communication with said liquid flow path and which receives said pressurized liquid; and

said squeegee means having a pressure receiving surface which is exposed to said pressurized liquid within said chamber and which has an effective area aligned to urge said squeegee means away from said reservoir means and toward the printing screen in response to the force exerted on said area by said pressurized liquid within said chamber.

4,023,487

PRINTING MACHINE WITH PRINTING INK DISPENSING ARRANGEMENT

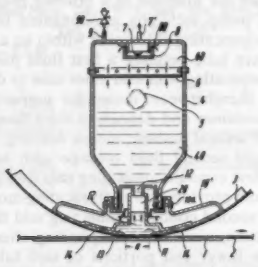
Mathias Mitter, Verl-Sende Mitte, Germany, assignor to Mitter & Co., Schloss Holte, Germany

Filed Aug. 13, 1974, Ser. No. 497,052

Claims priority, application Germany, Jan. 4, 1973, 2300289

Int. Cl.² B41F *15/40*

U.S. Cl. 101—120 **28 Claims**



22. In a screen printing machine, a combination comprising an enclosed elongated printing ink receptacle having an upper part, and a lower part provided with a plurality of individual flow-restricting outlet nozzles for outflow of printing ink; admitting means for admitting a body of printing ink into said receptacle; and means for maintaining a cushion of compressed gaseous fluid in said receptacle above said body of printing ink therein, to thereby exert a uniform pressure on the printing ink over the entire elongation of said receptacle and control the outflow of printing ink from said outlet nozzles, said means for maintaining comprising a flexible diaphragm subdividing the interior of said receptacle and completely separating it into a lower chamber in said lower part and containing said body of ink and an upper chamber containing said cushion of compressed gaseous fluid and completely out of communication with said lower chamber, the pressure in each of said chambers being responsive to fluctuations of pressure in the other chamber due to flexing of said diaphragm which is exposed to the pressures in both chambers, and control means for varying the compression of said cushion of compressed gaseous fluid in said upper chamber when it is desired to thereby vary the pressure in said lower chamber.

4,023,488

FLAT STENCIL FOR IMPRINTING TEXTILE FABRICS

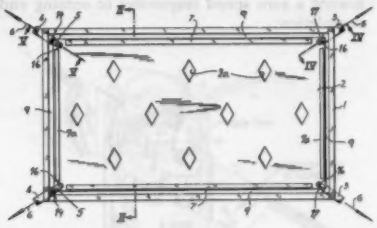
Peter Zimmer, Untere Sparchen 54, Kufstein, Austria (A 6330)

Filed Oct. 22, 1975, Ser. No. 624,935

Claims priority, application Austria, Oct. 22, 1974, 8481/74

Int. Cl.² B41F *15/36*

U.S. Cl. 101—127.1 **9 Claims**



1. A flat stencil for imprinting textile fabrics, comprising:

a rigid rectangular tenter frame;

a substantially rectangular sheet-metal foil with pattern-forming apertures surrounded by said tenter frame; and

a set of four stretching devices positioned at respective corners of said tenter frame;

at least one of said stretching devices being of a first type provided with a first holder, a first slider positively guided in said first holder for displacement along a diagonal of the rectangle, a first gripping element rigid with said first slider releasably engaging a corner of said foil, and first tensioning means anchored to said first holder and to said first slider for reversibly displacing said first gripping element;

the remaining stretching devices being each of a second type provided with a second holder, a second slider positively guided in said second holder for displacement along a diagonal of the rectangle, a second gripping element releasably engaging a corner of said foil, said second gripping element being pivoted to said second slider for swinging in the plane of said foil, and second tensioning means anchored to said second holder and to said second slider for reversibly displacing said second gripping element.

9. A flat stencil for imprinting textile fabrics, comprising:

a rigid horizontal tenter frame of rectangular shape;

a substantially rectangular sheet-metal foil with pattern-forming apertures, said tenter frame surrounding said foil and forming ledges which underlie marginal portions of said foil along the major sides of the rectangle;

stretching means at the corners of said tenter frame releasably engaging said foil for imparting tension thereto;

clamping means on said tenter frame releasably pressing said marginal portions against said ledges; and

flexible aprons extending from said tenter frame to the upper surface of said foil along the minor sides of the rectangle.

4,023,489

DOCUMENT ENDORSING CONTROL CIRCUITRY AND METHOD FOR MINIMIZING POWER CONSUMPTION REQUIREMENTS

Jack Beery, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Feb. 6, 1976, Ser. No. 655,790

Int. Cl.² B41F *13/24*

U.S. Cl. 101—235 **16 Claims**

1. In a document endorsing apparatus, a method of driving a rotational print head for endorsing successive documents moving therepast, comprising:

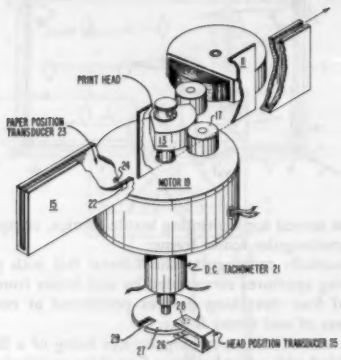
sensing individual documents of successive documents traveling along a path past a rotational print head;

driving the print head at a relatively constant rate of acceleration until reaching a predetermined print speed responsive to said sensing of an individual document;

endorsing the document when the print head is moving at said predetermined print speed;

sensing completion of said endorsing;

decelerating the print head at a relatively constant rate toward a zero speed responsive to sensing endorsement completion;



interrupting deceleration of the print head responsive to sensing a succeeding document and maintaining the speed of the print head at the speed when interrupted; and

accelerating the print head at a relatively constant rate until reaching said predetermined print speed responsive to a time delay after said interrupting, said time delay of sufficient magnitude to permit the head to accelerate to said predetermined print speed in time to endorse the succeeding document moving therepast.

4,023,490

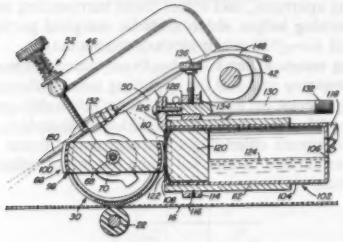
ROTARY IMPRINTING APPARATUS

Alfred A. Marozzi, 3 Cheryl Place, Pine Brook, N.J. 07058

Filed Aug. 14, 1975, Ser. No. 604,824

Int. Cl.² B41J *3/64, 3/56*

U.S. Cl. 101—235 **18 Claims**



1. In combination with a moving web, a rotary marking device adapted to mark the web by rolling contact therewith at spaced locations along the direction of travel thereof, including a print head, means rotatably mounting the print head for angular displacement from a rest position along a predetermined path establishing contact with the web, drives means powered by the movement of the web connected to said mounting means and including means for selectively and intermittently causing the displacement of the print head along said path to establish momentary contact with the web, an ink storing device for transferring ink to the print head when in contact therewith, means mounting the ink storing device for displacement between a retracted position and an extended position contacting the print head in the rest position thereof, and ink transfer control means for momentarily displacing the ink storing device to said extended position prior to said displacement of the print head from the rest position whereby the drag imposed on the web by the print head during printing contact is minimized.

4,023,491

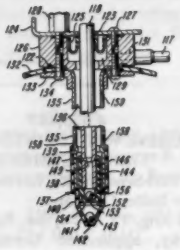
INK FOUNTAIN AND SUPPLY SYSTEM FOR A PRINTING PRESS

Raymond L. Kirby, Jr., Vandalia, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 411,283, Oct. 31, 1973, Pat. No. 3,901,150. This application Mar. 10, 1975, Ser. No. 556,738

Int. Cl.² B41F *31/08;* **B67D** *5/46*

U.S. Cl. 101—366 **7 Claims**



1. An improved system for supplying ink from an ink supply container to an ink fountain of a printing press, said system comprising a pump including an elongated inner tube supported for reciprocating movement within an elongated outer tube, said inner tube defining a first fluid passage and said outer tube cooperating with said inner tube to define a second fluid passage therebetween, means for supporting said tubes within said container and defining a third fluid passage connected to said second passage, means defining an opening for connecting said second fluid passage with said ink supply container, a first conduit connecting said first passage to said ink fountain and providing for reciprocating movement of said inner tube, a second conduit connecting said third passage to said ink fountain, a set of corresponding check valves connected to the lower end portions of said tubes, means for reciprocating said inner tube within said outer tube to effect pumping of ink from said container through said first passage and said first conduit to said ink fountain, and said second conduit cooperates with said second and third passage to return excess ink from said ink fountain to said ink supply container.

4,023,492

METALLIC-FUEL-ENHANCED, FOCUSED-GAS WARHEAD

Marvin L. Kempton, Socorro, N. Mex., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 18, 1968, Ser. No. 777,212

Int. Cl.² F42B *13/48*

U.S. Cl. 102—66 **6 Claims**

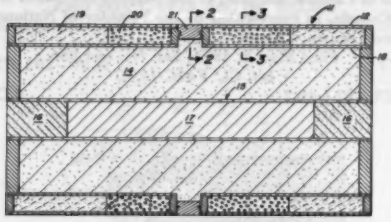
1. A warhead comprising:

an explosive charge;

two areas of two different metallic fuels surrounding the explosive charge, the metallic fuels being in a predetermined arrangement; and

means for initiating said explosive charge so that pressure created at the area of one of said metallic fuels is great

enough to fragment said metallic fuel and propel the fragments faster than the gas cloud created by said explo-



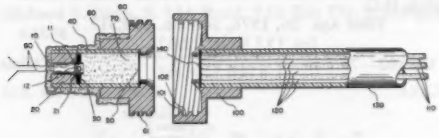
sive charge, the other metallic fuel being in an area in which lesser pressures are created.

4,023,493

FIRELINE DETONATOR

Carl F. Austin, Inyokern; Carl C. Halsey, and Samuel E. Kendall, both of China Lake, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 24, 1975, Ser. No. 616,236
Int. Cl.² F42B 3/10
U.S. Cl. 102—22 R **4 Claims**



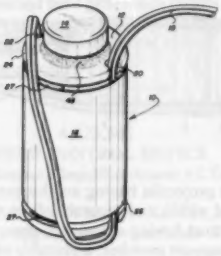
1. An explosive fireline cord detonator comprising:
a tube having first and second ends;
a cover rigidly attached to said first end of said tube for closing said end;
an explosive booster charge retained within said tube abutting said closed first end;
an apertured partition retained within said tube, spaced from said closed first end, abutting said booster charge;
an explosive bridgewire squib retained within said tube in contact with said booster charge through said aperture in said partition;
an annulus around said squib attached at a level so as to limit the penetration of the squib into the partition aperture;
a retaining plug attached within said tube, for holding said squib in contact with said booster charge;
a connector rigidly attached to said tube at said first end; and
a cohesive coating, having flame retardant properties, surrounding and adhering to said detonator for suppressing flame and heat caused by detonation of said booster charge;
so constructed and arranged that said detonator may be carried separately from and rapidly attached to said fireline cord.

4,023,494

EXPLOSIVE CONTAINER

Leslie W. Barton, Carrollton, and Don H. Smith, Dallas, both of Tex., assignors to Tyler Holding Company, Lewisville, Tex.

Filed Nov. 3, 1975, Ser. No. 628,214
Int. Cl.² F42B 3/00
U.S. Cl. 102—24 R **7 Claims**



1. An explosive container comprising:
a. a blow molded plastic hollow body comprising a tubular midsection forming the sidewalls thereof; an integral bottom section enclosing the lower end of said sidewalls; an integral top section partially enclosing the upper end of said sidewalls; said top section integrally jointed to an injection molded cylindrical neck section having threads integrally molded about its outer surface, said top section and bottom section and cylindrical neck section having a greater wall thickness than said tubular midsection; and said body having a U-shaped channel disposed axially along the length thereof defining a cord receiving groove, and a U-shaped channel extending axially along a portion of the length thereof defining a detonator receiving groove;
b. first radially projecting ridge means formed as an integral portion of said body and positioned at one end thereof;
c. second radially projecting ridge means formed as an integral portion of said body and positioned near the other end thereof;
d. tubular sleeve means positioned on said body and over said cord receiving groove and said detonator receiving groove, said sleeve means being retained on said body by said first and said second ridge means;
e. a plastic cup comprising a cylindrical portion having internal threads to match said threads on the exterior of said neck section, and a top portion, said cap means having an annular protrusion centered on the inside of said top portion and extending within said cylindrical section in opposed relationship to said cylindrical portion carrying said internal threads to thereby define an annular slot therebetween said cylindrical portion of said cap being shorter in length than said neck section so that when engaged thereon a gap will result between the open end of said cylindrical portion and the top section of said blow molded plastic body for receiving a sealent composition; and
f. a resilient deformable gasket positioned in said annular slot so that upon threadably engaging said cap with said neck section said annular protrusion extends into and adjacent the interior surface of said neck section and said gasket cooperates with the top portion of said neck section in sealing engagement.

4,023,495

TWIST BRAKES FOR PROJECTILES

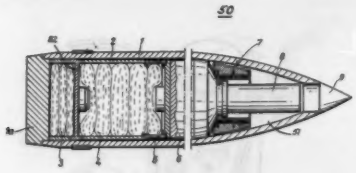
Siegmar Fischer; Karl-Heinz Silligmann, and Jüergen Prochnow, all of Duesseldorf, Germany, assignors to Rheinmetall G.m.b.H., Duesseldorf, Germany

Filed Apr. 12, 1976, Ser. No. 675,826

Claims priority, application Germany, Apr. 26, 1975, 2518645

Int. Cl.² F42B *13/38*

U.S. Cl. 102—35.6 4 Claims



1. In a twist projectile having an elongated housing, a payload supported within and separable from the housing during flight, the payload having associated therewith a twist brake comprising a support member, a plurality of wings, and means for pivoting one end of each wing to the support member, the wings being normally confined within the housing and pivotable outwardly from the support member upon separation of the payload from the housing to brake the rotational speed of the separated payload, the improvement wherein the twist brake further comprises a guide shoe interposed between each of the confined wings and the confronting wall of the housing to prevent contact of the wings with the housing, the inner surface of the guide shoe having a first portion for removably contacting the associated confined wing.

4,023,496

EJECTOR MOTOR BRAKING SYSTEM

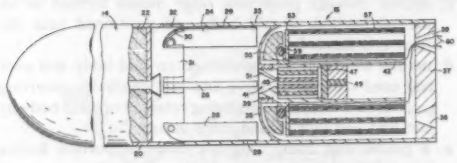
Robert H. Fink, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 9, 1972, Ser. No. 279,143

The portion of the term of this patent subsequent to Sept. 17, 1992, has been disclaimed.

Int. Cl.² F42B *15/10*

U.S. Cl. 102—49.4 5 Claims



1. In a tube launched missile system having a two stage separable missile to be launched from a rocket launcher tube that is open at each end, the improvement comprising:

a first stage that includes a first casing having a rocket motor mounted therein and foldable fin means mounted on the rearward end thereof,

a second stage that includes a second casing having its forward end slidably mounted on the rearward end of said first casing,

an ejector motor means mounted in said second casing and arranged to exhaust from the rearward end of said second casing so as to eject said missile from the launcher tube,

a braking motor means mounted in said second casing and arranged to exhaust from the forward end of said second casing for separating said first and second stages and decelerating said second stage substantially to zero by the time said second stage reaches the muzzle end of the launcher tube, thus reducing the risks of injury to the surroundingsby the second stage.

4,023,497

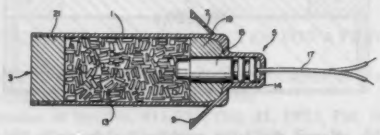
AFT-END IGNITION SYSTEM FOR ROCKET MOTOR

Elias P. Morris, Charlesbourgh, and Fred A. Christie, Ste-Foy, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed Mar. 8, 1976, Ser. No. 664,856

Int. Cl.² F42C *19/12*

U.S. Cl. 102—49.7 4 Claims



1. An igniter for a rocket motor consisting of a cylindrical tube having an open end and a closed end, a reduced section at the closed end, a plurality of segments extending outwardly from near the closed end and towards the open end; a squib secured in the reduced section, a charge in the tube and a polyurethane foam plug in the open end of the tube, the segments being of such a flexibility and strength that during the detonation of the squib, the igniter is first held in place and then is permitted to move so bending the segments inwardly until they contact and break the cylindrical tube and hence initiate total collapse and ejection of the igniter.

4,023,498

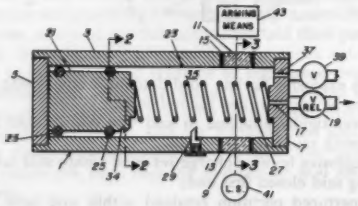
OPTICAL SWITCH

Paul Harris, Madison, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 26, 1976, Ser. No. 680,317

Int. Cl.² F42C *13/02*

U.S. Cl. 102—70.2 R 9 Claims



1. An optical switch comprising:

a hollow housing having a pair of aligned windows in opposite side walls defining a transverse optical path therethrough;

an external light source positioned in said path on one side of said housing for projecting light through said housing;

external means positioned in said path on the other side of said housing and responsive to a predetermined light intensity to initiate a desire function;

a light attenuating gas in said housing and in said path for limiting the intensity of the light received by said external means to a value less than said predetermined light intensity in one condition, and for permitting sufficient light to pass therethrough to produce said predetermined light intensity at said external means in another condition; and

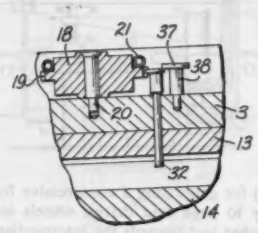
means for reducing the pressure and density of said gas in said housing sufficiently to increase said received light intensity to said predetermined light intensity.

4,023,499

FUSE FOR RIFLE-GRENADE

Rene M. Chavee, Genk, Belgium, assignor to Fabrique Nationale Herstal S.A., Herstal-lez-Liege, Belgium

Filed May 1, 1975, Ser. No. 573,565
Claims priority, application Belgium, Jan. 7, 1975, 254070
Int. Cl.[2] F42C 15/00
U.S. Cl. 102—76 R 3 Claims



1. In a fuse device having a movable bolt movable to an arming position to release an inertia striker, said inertia striker being arranged to strike a detonator upon impact of said device with a target, a rotor carrying a pyrotechnic charge responsive to said detonator but in a first rotary position wherein said charge is remote from said detonator and being spring biased toward a second position wherein said charge is adjacent said detonator, the improvement comprising:

a rod axially slidably mounted on said device and having a head at one end engaging said rotor to lock the same in said first position, the other end of said rod being in the path of movement of said bolt; and

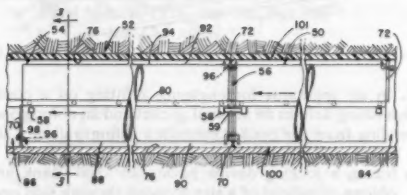
a bendable stationary member overlying said head to hold the same in said rotor locking position whereby movement of said bolt to said arming position enforces movement of said rod and head out of rotor locking position by bending and deflecting said bendable stationary member.

4,023,500

HIGH-SPEED GROUND TRANSPORTATION SYSTEM

Richard E. Diggs, S. 12A Road, P.O. Box 776, Carthage, Mo. 64836

Filed Oct. 23, 1975, Ser. No. 625,139
Int. Cl.[2] B61B 13/10
U.S. Cl. 104—138 R 19 Claims



1. A high-speed ground transportation system comprising:

a gas-filled tunnel having wheel ways defined therein; a vehicle located in said tunnel; means operatively connected with said tunnel for selectively pressurizing and evacuating portions of said tunnel to create a pressure differential across the vehicle located therein to propel said vehicle therethrough;

said vehicle having a top and bottom and upright seal means slidably contacting said tunnel and positioned on said vehicle in a manner such that said vehicle top is exposed to an evacuated portion of said tunnel and said vehicle bottom is exposed to a pressurized portion of said tunnel so that pressurized gas is located beneath said vehicle to create a gas film on which said vehicle rides as it is propelled through said tunnel, said gas film being the sole means for supporting said vehicle during movement of said vehicle on said gas film, and a horizontal seal positioned on said vehicle to separate said top from said bottom, said horizontal seal being flexible to allow vertical movement of said vehicle;

a plurality of wheels mounted on said vehicle for supporting same when said vehicle is not supported on said gas film, said wheels being mounted on said vehicle to be located in said tunnel wheelways; and

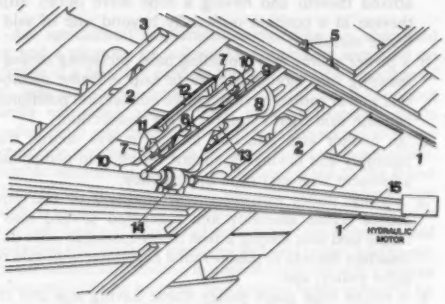
a magnetic stabilizing means for stabilizing said vehicle and including first field generating means mounted on said vehicle, first field producing means mounted on said tunnel to cooperate with said first field generating means, second field producing means mounted on said vehicle wheels, and second field generating means located in said tunnel wheelways to cooperate with said second field producing means to maintain said vehicle stable.

4,023,501

SPEED CONTROL DEVICE

Hans Rudolf Haldimann, Restellberstrasse 65 Zurich, Switzerland

Filed Feb. 20, 1975, Ser. No. 551,236
Claims priority, application Switzerland, Feb. 22, 1974, 2662/74
Int. Cl.[2] B61B 13/12
U.S. Cl. 104—147 R 4 Claims



1. A speed control device for controlling the speed of a transport vehicle rolling on a rail track, especially for use in a shelf storage system, comprising:

a pair of spaced apart rails forming part of the structure of a warehouse shelf and constituting the supporting and guiding track for the vehicle;

a transport vehicle supported on said rails;

a revolving braking and accelerating means for said vehicle;

a predetermined speed driving means for driving said braking and acceleratingmeans;

said braking and accelerating means consisting essentially of a spring-tensioned endless belt, a fixed subframe, bracket support means, and a spring means;

said belt being resiliently supported on said fixed subframe and being able to move from a rest position, which is out of engagement with said driving means but in the path of said vehicle to a working position which is in engagement with said driving means and in frictional engagement with the vehicle, the resilient movement of said belt from said rest position to said working position and back being effected by means of the passing vehicle itself and being opposite to the force of said spring means;

roller means including axles which rests upon openings in said bracket means, the necks of the axles resting against the upper portions of the openings in said bracket support means of said braking and accelerating means; and,

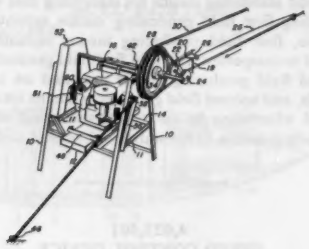
disc means on the ends of said axles to prevent said spring means from jumping off the necks of said axles.

4,023,502

PORTABLE SKI TOW APPARATUS

John William Elsing, 7202 Shannon Drive, Edina, Minn. 55435

Filed Oct. 2, 1975, Ser. No. 619,079
Int. Cl.² B61B 9/00
U.S. Cl. 104—173 ST 12 Claims



1. A portable rope tow apparatus for a ski slope, comprising:

a. a power source frame assembly having a pair of spaced apart and connected A-frame members, and having a rotatable shaft journaled at the top of said A-frame members and extending outwardly beyond one of said A-frame members, said shaft having a rotatable drive connection affixed thereto and having a rope drive pulley affixed thereto at a position outwardly beyond one of said A-frame members;

b. a power source and mounting base, including means for securing said mounting base to said A-frame members, said power source having a drive connection positionable beneath said shaft rotatable drive connection;

c. an anchor arm attached to said power source frame assembly and having an anchor terminal in planar radial alignment with said rope drive pulley;

d. a guide pulley extension arm attached to said power source frame assembly and elongated toward said ski slope, said arm having a first freely rotatable idler pulley attached thereto in planar radial alignment with said rope drive pulley; and

e. a return rope guide pulley frame having legs and cross frame members, and having a freely rotatable return rope guide pulley attached to one of said cross frame members, and having an anchor terminal attached to one of said cross frame members, and having an anchor terminal attached adjacent said return rope pulley.

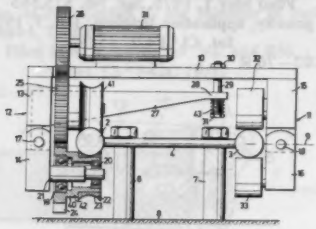
4,023,503

CONVEYING INSTALLATION

Olof Sune Grop, Enskede, Sweden, assignor to Tekniska Rontgencentralen AB, Stockholm, Sweden

Filed Oct. 3, 1975, Ser. No. 619,159
Claims priority, application Sweden, Oct. 3, 1974, 7412450
Int. Cl.² B61D 15/12
U.S. Cl. 105—30 6 Claims

1. A conveying installation intended to be placed on or adjacent to a surface on an object for complete or partially inspecting the latter, comprising: an inspection trolley, a rail cylindrical track said trolley having two pairs of wheels (40, 41; 32, 33) arranged to be driven on said rail track (1) following the surface portions which are to be inspected, said rail track comprising two rails (2) (3) substantially parallel with each other, the first pair of wheels of the trolley coacting with one rail (2) and being axially undisplaceable relative to the rail, the second pair of wheels of the trolley coacting and axially displaceable relative to said second rail, the wheels of each pair being arranged one above the other, and the respective pairs engage the associated rail between them, at least the first pair of wheels (40, 41) coacting with said one rail (2) have a trough-shaped circumferential surface, which grips around the adjacent cylindrical surface of the rail and fixes the wheel in an axial direction, at least one of said pairs of wheels have wheels driven by a driving means (24, 25, 26, 31), and



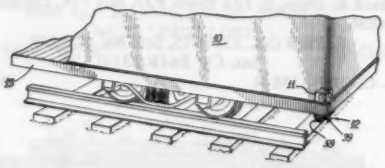
means (24, 43) for generating a compressive force independent of gravity to urge said driven wheels in a direction towards each other and towards the intermediately lying rail portion.

4,023,504

FLATBED CAR CONTAINER SEWING DEVICE

Vincent G. Grey, 607 Randolph St., Falls Church, Va. 22046

Filed Mar. 29, 1976, Ser. No. 671,075
Int. Cl.² B60P 7/08; B61D 17/00, 49/00; B65J 1/22
U.S. Cl. 105—366 B 10 Claims



1. In an apparatus for engaging a fitting on a container which fitting defines an internal pocket and an oblong opening extending from the pocket through a fitting wall to a side of the fitting, said apparatus comprising

a frame, a locking device having an axial shank and an oblong crosshead of a size to move through said opening when aligned therewith and to engage said wall when positioned transverse to said opening, said shank being journaled in said frame for axial and rotational movements, means engaging said shank for rotating said locking device and for selectively permitting and selectively preventing said locking device moving in the direction such that the crosshead is moving away from said frame, the improvement comprising:

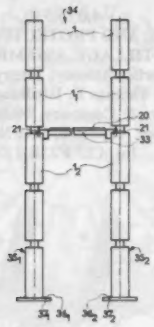
said means including a rack extending axially along said shank, said rack being a quadrant of an annulus having its axis coincident with the shank axis, and an actuating lever having an end in the form of a segment of a gear about a second axis, said end being in engagement with said rack, said lever being secured to said frame for rotation about said second axis which is normal to said shank axis, said actuating lever including means for rotating it about said second axis thereby moving said shank axially.

4,023,505

SHELVING UNITS

Rene Fleck, Hochstatt, France, assignor to Societe Anonyme dite: TIM-FLECK S.A., France

Filed Feb. 17, 1976, Ser. No. 658,577
Claims priority, application France, Feb. 25, 1975, 75.06499
Int. Cl.² A47B 9/00
U.S. Cl. 108—110 7 Claims



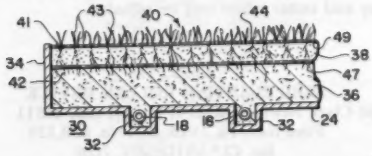
1. A support system for shelving and the like, comprising;
a plurality of sleeves, each having an outer, hollow sleeve member and, coaxially, rigidly interconnected therewith in an inner portion thereof, an hollow sleeve member longer than the outer member, the inner members being shaped and disposed for being longitudinally telescoped with one another to fit the sleeves together while leaving gaps between the respective outer members; and
a plurality of clips, each dimensioned and shaped to permit removably attaching it to one of the outer members in one of the gaps, for supporting accessories such as shelves on the clips and thereby on the sleeves fitted together by the telescoped inner members.

4,023,506

SYSTEM AND PROCESS FOR PROVIDING DURABILITY ENHANCED AREA

Melvin J. Robey, West Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

Filed Mar. 8, 1976, Ser. No. 664,865
Int. Cl.² A01G 7/00
U.S. Cl. 111—1 13 Claims



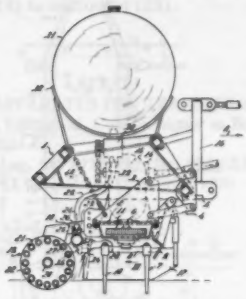
1. An area having a durability enhanced surface intended for heavy use, said area comprising:
a base;
a rooting medium above and supported by said base;
a vegetative crop at the surface of said area, said vegetative crop having growing points in said rooting medium, blades extending upwardly from said growing points, and roots extending downwardly from said growing points;
first apertured means contiguous to and below said rooting medium and having said roots of said vegetative crop extending through the apertures in said first apertured means; and
second apertured means contiguous to and above said rooting medium and having said blades of said vegetative crop extending through the apertures in said second apertured means with said apertured means being positioned and configured so as not to impede use of said area in the intended manner.

4,023,507

SOIL CULTIVATING IMPLEMENTS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Aug. 1, 1975, Ser. No. 601,098
Int. Cl.² A01C 23/02
U.S. Cl. 111—6 27 Claims



1. An agricultural implement comprising an elongated frame and a plurality of soil-working members mounted on said frame in a row that extends transverse to the direction of travel, said members having tines and being rotatable about upwardly extending axes defined by corresponding shafts depending from said frame, driving means connected to rotate said members and said tines to work the soil during operation, a rotatable supporting member being connected to the frame and located to the rear of said soil-working members, said supporting member being a roller that is rotatable about a substantially horizontal axis and spraying means being located between said soil-working members and said roller, said spraying means comprising nozzles in communication with a source of fluid material to be sprayed, said nozzles being mounted on support means and positioned adjacent the soil-working members at the rear thereof, whereby material is sprayed in the immediate proximity of the soil-working members during operation.

4,023,508

APPARATUS TO BURN WASTE COMBUSTIBLE POLYMERS

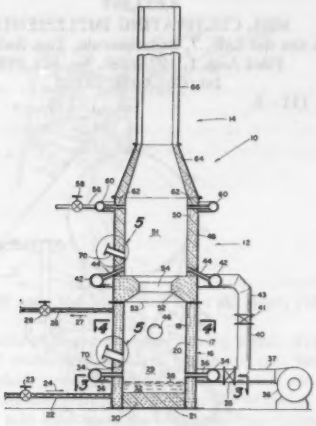
Clifford J. Cantrell, Jr., and Gary D. Hanlon, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Filed Apr. 22, 1976, Ser. No. 679,397
Int. Cl.² F23G 5/12
U.S. Cl. 110—8 A 8 Claims

1. Apparatus for burning waste particulate matter, comprising:
a. a cylindrical base portion, including;
1.double cylindrical walls and means to circulate water in at a bottom inlet and utilize steam at an upper outlet, and means to control the rate of water inflow, whereby a selected temperature can be maintained in said base portion;
2. means to inject solid particulate material of selected thermal and combustion characteristics at a port near the top of said base portion;
3. thermal insulating means over the base of said base portion adapted to support said particulate material;
4. burner means in said base section to ignite said particulate matter;

5. means to inject air under pressure, at a controlled rate for combustion of said particulate matter under reducing conditions, with less than stoichiometric air;

b. an intermediate choke portion, mounted on top of said portion, said choke of refractory material, having a central opening of smaller diameter than the diameter of said base portion;



c. an afterburner chamber on top of said choke portion; all three portions suitably fastened and sealed together and including;

1. said afterburner chamber lined with refractory;
2. means to inject excess combustion air under pressure, to completely burn the gases formed in the partial combustion in said base portion; and

d. stack means to conduct to the atmosphere the products of combustion in said afterburner chamber.

4,023,509

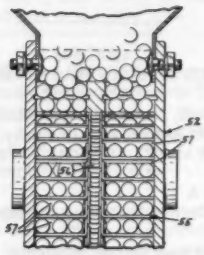
APPARATUS FOR PLANTING A PLURALITY OF INDIVIDUAL SEEDS IN A PLANTING FURROW

Morris R. Hanson, Rte. No. 2, Winnebago, Minn. 56098

Filed Nov. 12, 1975, Ser. No. 631,072

Int. Cl.² A01C *7/18*

U.S. Cl. 111—77 **7 Claims**



1. A seed planter, having furrowing means and a planting shoe, said planter comprising:

a. at least one seed hopper;

b. means for regulating discharge of seeds from said hopper;

c. an endless conveyor comprising an endless chain having a plurality of lateral extensions thereon forming a plurality of regularly spaced pockets on either side of said chain, said conveyor being positioned such that it is in close engagement with said means for regulating discharge of seeds from said hopper, and extending downwardly from said hopper to a point in close proximity to a planting site adjacent the planting shoe, where said pockets of said conveyor are inverted and seeds carried in said pockets from said discharge regulating means are released from said pockets;

d. means for driving said conveyor; and

e. means for sequentially dropping seeds from the planter to the soil at or near the point where the conveyor pockets are inverted.

4,023,510

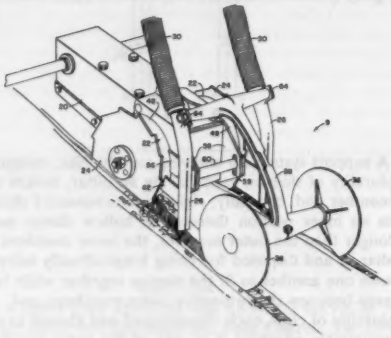
DEPTH CONTROL AND PROTECTIVE APPARATUS FOR TILLAGE ASSEMBLY

Donald Thomas Sorlie, Ankeny; Henry William Brandt, Jr., Des Moines, and Thomas E. Hitzhusen, Huxley, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jan. 15, 1976, Ser. No. 649,333

Int. Cl.² F23B *1/00*

U.S. Cl. 111—85 **10 Claims**



1. In a tillage unit having a cutter wheel mounted for rotation on a drive shaft on a pivotable arm of said tillage unit, a depth control and protective apparatus, comprising:

a band adjacent to the cutter wheel on said arm of said tillage unit, the lower portion of said band being ground engageable to determine the depth of furrow to be cut by said cutter wheel during normal operation;

seed tube means having a seed tube boot with a seed discharge portion;

seed tube mounting means connected with said band so that said seed tube boot is protected against foreign matter during normal operation of said cutter wheel; and

depth adjustment means for mounting said band to said arm of said tillage unit, whereby the depth of furrow to be cut by said cutter wheel may be adjusted.

4,023,511

SEED PLANTING ROLLER DEVICE

Dwight Clark Newman, R.R. 1, Culver, Ind. 46511

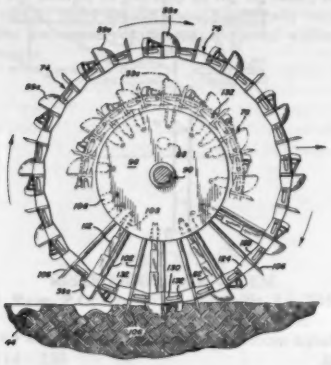
Filed Nov. 10, 1975, Ser. No. 630,131

Int. Cl.² A01C *5/04, 7/20*

U.S. Cl. 111—89 **21 Claims**

1. In a seed-planting device having a roller member positioned for rolling contact with the ground; protrusions carried on the periphery of said roller member for producing holes in the ground and thereafter withdrawing therefrom while rolling; and means for depositing seed and the like into said holes through said protrusions; the improvement comprising, in combination: said protrusions being carried on peripherally-mounted bracket plate members; radially mounted, adjustable spokes secured to said bracket plate members at the ends thereof; means for varying the extension of said spokes to pre-set said roller member circumference prior to use, while holding the extension of said spokes and said circumference constant during use; and sliding linking means connecting said

bracket plate members, whereby said bracket plate members and protrusions may be uniformly moved radially inwardly and outwardly by adjustment of said spokes to adjust the peripheral distance between said protrusions, said sliding linking means including wall members extending inwardly from said roller periphery, said wall members being carried by said peripherally-mounted bracket plate members, the wall



members of said plate members overlapping adjacent wall members of adjacent bracket plate members, and defining generally circumferentially directed slots, and a pin member carried by each said plate member and slideable in the slot of each said overlapping wall member to slidingly connect adjacent bracket plate members, whereby the radially inward and outward movement of said connected bracket plate members is uniform.

4,023,512

THREAD FEEDER FOR SEWING MACHINE

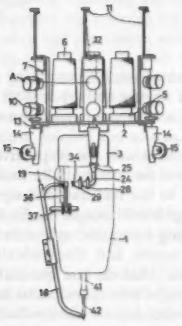
Toshio Miyamoto, 17-27, 2-chome, Himezato, Nishiyodogawa, Osaka, Japan

Filed Sept. 13, 1975, Ser. No. 610,057

Claims priority, application Japan, Sept. 3, 1974, 49-102191

Int. Cl.² D05B *49/00*

U.S. Cl. 112—242 **2 Claims**



1. A thread feeder for a sewing machine to selectively feed a thread from one of several bobbins to the eye (43) of a sewing machine needle (42) in a needle holder (41) at the working end of an arm (1), comprising in combination:

a. a moveable table (2) disposed above said arm (1) having a plurality of bobbin holders (5) for supporting bobbins with thread (12) thereon for moving said bobbins to a feeding station;

b. guide means (14, 15) below each bobbin to guide and feed thread from the bobbin downwards;

c. a suction-pipe (24) at said feeding station with an outwardly flanged downwardly tapered portion at its top so adapted and disposed that the guide means (14) can be disposed directly over said flanged portion, blast and suction means (28, 29) coupled to said suction pipe (24); and,

d. a thread take-up (19) fed by said suction pipe (24) with an outlet thread aperture (20) and an elongated thread guide pipe (18) having an inlet (21) opposite said thread aperture (20), and an outlet (23) opposite said eye (43), a blast port (22) in said thread guide pipe (18) into which air is blown to suction the thread through the thread guide pipe (18) to said outlet (23).

4,023,513

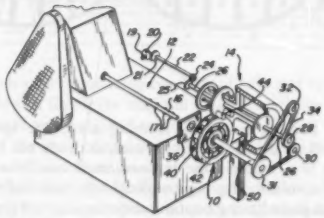
METHOD AND APPARATUS FOR TRANSFERRING CANS

Geoffrey J. Dean, Lakewood, Colo., assignor to Ball Corporation, Muncie, Ind.

Filed Aug. 18, 1975, Ser. No. 605,683

Int. Cl.² B21D *43/00*; B65G *29/00*

U.S. Cl. 113—115 **7 Claims**



1. In combination with an individual article producing apparatus including a longitudinally reciprocating ram and dies associated with the ram for producing articles, and a work station for processing such articles, a transfer mechanism for synchronously moving cylindrical articles from the ram to the work station, the transfer mechanism comprising:

a wheel structure mounted for rotation around an axis parallel to the axis of the ram, a plurality of substantially equally spaced pockets carried on the periphery of the wheel structure at a radius of the wheel structure substantially corresponding to the displacement between the axis of the wheel structure and the axis of the ram, the pockets being comprised of leading and following mutually articulated, independently movable sections and being in the form of an opening facing away from the axis of the wheel structure and extending less than 180° around the center of the opening, cam followers connected to each of the sections and a fixed substantially circular cam for each cam follower concentric with the wheel structure positioned to receive the cam follower and having a raised lobe portion for initiating movement of the leading section towards a closed configuration as the leading section passes the ram but prior to movement of the second section to the closed position, guide means concentric with the wheel structure but spaced therefrom positioned between the ram and the work station, means for removing an article from a pocket at the work station, and means for synchronously and continuously moving the wheel structure, the forming ram and the work station, whereby articles formed on the ram may be ejected from the extended ram into an open pocket adjacent the end of the ram while the wheel structure is continuously rotating, the article initially being positioned by the closing of the leading section of the pocket and thereafter accurately contained within the pocket by the closed sections

of the pocket and the guide means for transport to and transfer to the work station.

4,023,514

LIQUID STORAGE FLOAT FORMED OF STEEL CONCRETE OR PRESTRESSED CONCRETE

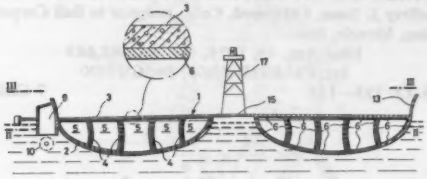
Ulrich Finsterwalder, Munich-Obermenzing, and Klemens Finsterwalder, Socking near Starnberg, both of Germany, assignors to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Germany

Filed Dec. 18, 1975, Ser. No. 642,318

Claims priority, application Germany, Dec. 24, 1974, 2461462

Int. Cl.² B63B *35/44*

U.S. Cl. 114—256 **14 Claims**



1. A floating container forming a storage space for the intermediate storage of liquids such as crude oil, liquefied gas and the like, wherein the improvement comprises a toroidal body of revolution having a vertical axis, said body comprising a bottom plate having continuously curving surfaces forming a shallow annular shaped dish, said bottom plate having a radially inner edge and a radially outer edge with the radially inner edge spaced radially outwardly from the vertical axis, a substantially planar circular cover plate extending around the radially outer edge of said bottom plate and forming a closure for the shallow annular shaped dish formed by said bottom plate, said cover plate supported on the radially inner edge and the radially outer edge of said bottom plate, said bottom plate and cover plate combining to form a closed annular shaped space within said toroidal body, said bottom plate and cover plate being formed of concrete.

4,023,515

FLOATING WAVE POWERED PUMP

Leonard C. Tharaldson, Redlands, Calif., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 8, 1975, Ser. No. 638,748

Int. Cl.² F03C *1/26*

U.S. Cl. 114—256 **2 Claims**

1. In a wave-powered pumping system, the combination of:

a floating platform;

an accumulator tank carried on said platform;

a plurality of pumps carried on said platform;

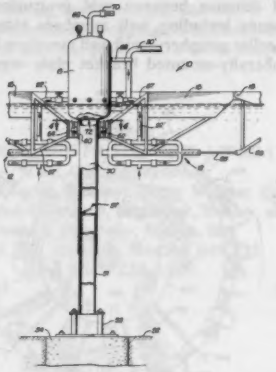
means connecting the pump outputs to said tank, each of said pumps having an input opening below the water line of said platform;

a plurality of floats;

means mounting each of said floats to said platform for relative pivoting motion of the float and platform about a generally horizontal axis;

means connecting each of said floats to a corresponding pump whereby relative pivoting of the platform and float actuates the pump;

first and second vertically disposed telescoping pipes with the upper pipe connected to said tank and with the lower pipe adapted for anchoring; and



a gimbaled mounting for supporting said tank on said platform.

4,023,516

SHIP STABILIZING SYSTEMS

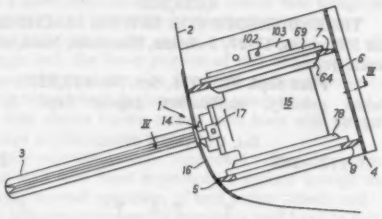
David Alexander Bennett, Bracknell, England, assignor to Sperry Rand Corporation, New York, N.Y.

Filed Aug. 8, 1975, Ser. No. 602,939

Claims priority, application United Kingdom, Aug. 20, 1974, 36535/74

Int. Cl.² B63B *39/06*

U.S. Cl. 114—126 **8 Claims**



1. A ship stabilising system comprising at least one retractable fin supported at one end by a shaft which, when in an operative position, extends outwardly from the ship below the water-line thereof,

at least one box in which the respective fin is mounted, of the ship so as to be substantially flush therewith,

means attached to the fin shaft and operable to tilt the fin about the longitudinal axis of the fin shaft including a pair of double-acting hydraulic cylinders housed within a fin shaft casing means, and diametrically opposed connection means provided on the fin shaft for pivotally connecting the respective cylinders to the fin shaft whereby said tilting means impart substantially zero bending moment to said fin shaft,

means operable to move the fin about a generally vertical axis to and from a stowed position in which the fin lies within the box disposed within the hull of the ship, and to and from the operative position,

said fin shaft casing means housing the major portion of the fin shaft, the means attached to the fin shaft and operable to tilt the fin about the longitudinal axis of the fin shaft, and associated components, said casing means being

rotatable on movement of the fin to and from the operative position, and

upper and lower bearing means being provided in top and bottom walls, respectively, of the associated fin box for accommodating rotation of said casing means, the upper and lower bearing means including bearings being so dimensioned whereby access can be gained therethrough from the interior of the ship to the fin shaft, the means operable to move the fin about a generally vertical axis, and the associated components mounted within the casing means.

4,023,517

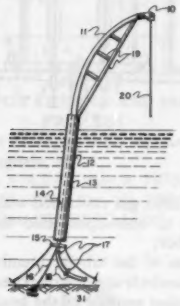
RISER MOORING SYSTEM

William J. Ryan, P.O. Box 367, Loreauville, La. 70552

Filed Aug. 11, 1975, Ser. No. 603,345

Int. Cl.² B65B *3/04*

U.S. Cl. 114—230 **15 Claims**



1. A marine riser mooring system, wherein fluids are to be transferred between a source on the water bottom and a marine vessel, capable of use in both calm and rough weather conditions, comprising the following elements:

a. an elongated, buoyant riser means for transmitting fluids between the source and the vessel, said riser means being connected at its lower end portion to the source and connectable at its upper end portion to the vessel;

b. anchor means attached to said lower end portion of said riser means for anchoring it to the water bottom;

c. articulation means, joining the source and the lower end portion of said riser means, for allowing articulation of said riser means in all directions with respect to the source and the water bottom;

d. a structural pedestal rigidly fixed to said vessel, said pedestal provided with a fluid conveying aperture therein; and

e. a riser head rotatably and pivotally connectable to said pedestal by connection means for allowing articulation in all directions, said riser head comprising:

a fluid transmitting bifurcated yoke, said yoke being sealably fitted to said riser means, and

a fluid transmitting pedestal cap, said cap being pivotally, sealably connected to said yoke at the bifurcations of said yoke, such that fluid can be transmitted through the bifurcations in said yoke through said pedestal cap, said cap being sealably connectable to said pedestal to allow fluid transmission between said pedestal cap and the aperture of said pedestal.

4,023,518

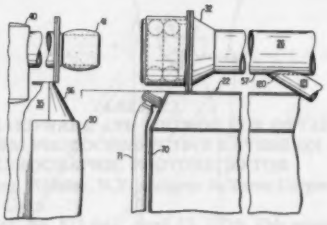
DREDGE PIPE COUPLING SYSTEM

Willard F. Fahrner, 251 Florence St., SW., Aiken, S.C. 29801

Continuation of Ser. No. 483,706, June 27, 1974, abandoned, which is a division of Ser. No. 302,543, Oct. 31, 1972, Pat. No. 3,820,258. This application Jan. 20, 1976, Ser. No. 650,715

Int. Cl.² B63B *21/62*; **B67C** *3/34*

U.S. Cl. 114—244 **12 Claims**



1. Apparatus for connecting conduits of adjacent vessels for the conveying of liquiform material which comprises:

a first vessel and a second vessel;

a notch in the stern of said second vessel adapted to receive the bow of said first vessel;

means for substantially rigidly coupling said vessels together with said first vessel's bow received in the notch of said second vessel;

a first conduit mounted at the bow of said first vessel;

a second conduit mounted at the stern of said second vessel in a position for direct connection to said first conduit when said vessels are rigidly coupled together by said coupling means, the relationship of said vessels and said conduits being such that with said vessels trimmed whereby said conduits are at substantially the same level and with said vessels rigidly coupled together by said coupling means, one of said conduits is positioned whereby it is received by the other said conduit;

an outlet conduit portion included in said one conduit and an inlet conduit portion included in said other conduit receiving said outlet conduit;

pneumatic responsive means disposed between said inlet conduit portion and said outlet conduit portion receiving said inlet conduit portion, said responsive means comprising a pair of annular expansible members, the first surrounding said outlet conduit portion and the second surrounded by said inlet conduit portion, said first and second annular members located in their respective conduits so as to be in juxtaposition when said vessels are rigidly coupled together;

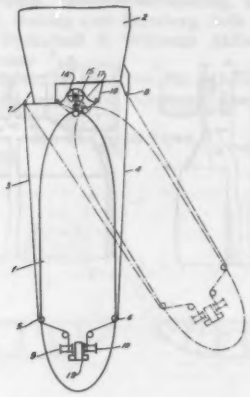
a pressurized air supply in air flow communication with said annular members of said pneumatic responsive means which are thereby adapted to be expanded against each other by said pressurized air supply; and

remote control means for selectively controlling the admission of pressurized air from said pressurized air supply to said pneumatic responsive means which is adapted selectively and rapidly to expand said pneumatic responsive means when said outlet conduit portion is received in said inlet conduit portion whereby said first and second conduits are rapidly connected in a substantially fluid-tight condition.

4,023,519
COUPLING FOR MARINE VESSELS

Horst Harms, Bremerhaven, Germany, assignor to Aktiengesellschaft "Weser", Bremen, Germany

Filed June 23, 1975, Ser. No. 589,280
Claims priority, application Germany, June 25, 1974, 2430468
Int. Cl.² B63D 21/56
U.S. Cl. 114—247 8 Claims



1. An apparatus for coupling together a pushing vessel and a pushed vessel and for steering said coupled vessels, comprising thrust coupling means operatively connecting the stern of the pushed vessel with the bow of the pushing vessel and allowng relative movement of said vessels about a vertical axis; a pair of elongated flexible connecting means extending between said vessels, one on each side, and each having one end portion connected to the pushed vessel and another end portion; a pair of coaxial winch drums rotatably mounted on said pushing vessel; and drive means, comprising means for coupling said drums jointly or separately with said drive means so that said drums may be rotated jointly or separately, at the option of the user, one of said connecting means having said other end portion thereof convoluted about one of said drums in one direction and the other of said connecting means having said other end portion thereof convoluted about the other of said drums in an opposite direction so that, when said drums are rotated jointly in the same direction, taking-up of one of said connecting means on one of said drums is accompanied by paying-out of the other connecting means from the other of said drums, and vice versa.

4,023,520
REACTION CONTAINER FOR DEPOSITION OF ELEMENTAL SILICON

Konrad Reuschel, Vaterstetten, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

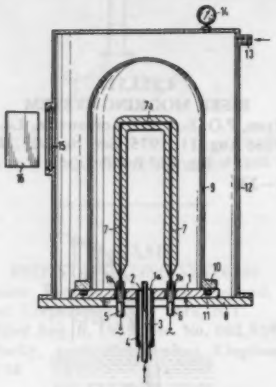
Filed Apr. 21, 1976, Ser. No. 679,088
Claims priority, application Germany, Apr. 28, 1975, 2518853
Int. Cl.² C23C 13/08
U.S. Cl. 118—8 7 Claims

1. In a reaction container for deposition of elemental silicon from a reaction gas capable of thermally decomposing and depositing elemental silicon onto heated silicon mandrels positioned within the reaction container, wherein the reaction container includes a plate-shaped support member having apertures for mounting thereon gas inlet and outlet tubes for supplying and removing the reaction gas to and from such container as well as spaced-apart electrodes which support the mandrels and a tubular member positionable in a gas impermeable manner onto said support member so as to encompass the mandrels, the improvement comprising wherein:

said tubular member has all portions thereof composed of pure silicon;

the mandrels positioned within said tubular member comprise two parallel silicon rods having a lower end thereof mounted on the electrodes and having a conductive bridge member connected across the upper ends thereof, said bridge member having a cross-section of such size that the current passing through the mandrels and the bridge member from the electrodes is insufficient to heat such bridge member up to the deposition temperature but said current is sufficient to heat the mandrels to the deposition temperature;

the tubular member is forced against the plate-shaped support member is a gas impermeable manner with the aid of



a pressurized inert gas contained within a pressure housing sufficient to encompass said tubular member and support member;

the wall portions of the tubular member laterally encompassing the mandrels are of a thickness sufficient to allow infrared radiation emitted by the heated mandrels during the deposition process to pass therethrough, and including an infrared image-converting means positioned outside the reaction container for sensing such infrared radiation and producing signals for controlling the dimensions of the silicon layers deposited on the mandrels and for controlling the temperature of such mandrels; and

said infrared image-converting means comprising a television camera having a optical reproduction system adapted for infrared radiation and an infrared responsive vidicon coupled therewith in an operative manner.

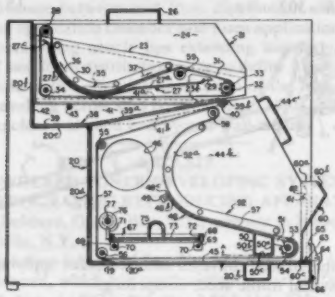
4,023,521
TUMBLE BATTER AND BREADER MACHINE

Raymond E. Booth, Sandusky, Ohio, assignor to Sam Stein Associates, Inc., Sandusky, Ohio

Filed July 11, 1975, Ser. No. 595,299
Int. Cl.² B05C 3/10
U.S. Cl. 118—16 17 Claims

1. A food coating machine comprising a housing having parallel side walls and a bottom, an imperforate pan for containing a fluidized pool of coating material extending between said side walls, said pan having a generally flat end supported in said housing in a generally horizontal position, said pan having its opposite end curved smoothly upwardly through an arc tangent to said flat end, said arc extending from the point of tangency until the radius of said arc has swept through an angle between about 45° and 120° past the said point of tangency, an endless open mesh wire conveyor belt substantially the width of said pan, means guiding a working run of said belt

close to the upper surface of said pan along said curved end, there being a return run of said belt spaced from said working run, there being a clear space above said working run, and means for driving said belt to carry said working run in a first direction from said flat end toward said curved end of said



pan, whereby a pool of fluidized coating material may be provided in said pan, food portions may be placed in said pool and said conveyor belt may be driven in said direction to tumble said food portions in said pool of coating material to thoroughly coat the same.

4,023,522

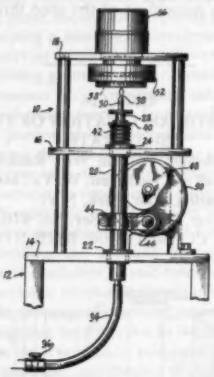
ATTENUATION SPOT FILTERS AND MANUFACTURING PROCESS

Rein Randmae, Fort Salonga, N.Y., assignor to Vicon Industries, Inc., Farmingdale, N.Y.

Division of Ser. No. 576,027, May 9, 1975. This application June 29, 1976, Ser. No. 700,791

Int. Cl.² B05C *11/00*

U.S. Cl. 118—47 **3 Claims**



1. A machine for manufacturing an attenuation spot filter, comprising:

a. vertically-movable aperture tube containing a gas discharge orifice.

b. a substrate horizontally disposed above said gas discharge orifice,

c. rotating means for rotating said substrate about a vertical axis,

d. vertical control means for controlling the vertical distance between said gas discharge orifice and said substrate, and

e. a gas supply in delivery communication with said gas discharge orifice,

f. whereby carbon is deposited on said substrate by a flame ignited at said gas discharge orifice.

4,023,523

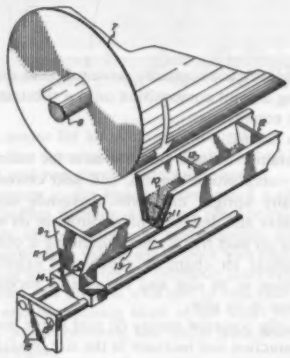
COATER HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTORECEPTOR

Samuel W. Ing, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 571,047, April 23, 1975. This application June 21, 1976, Ser. No. 698,399

Int. Cl.² C23C *13/08*

U.S. Cl. 118—49.1 **7 Claims**



1. A batch coating device for vacuum coating vaporizable coating materials or components thereof onto receiving surfaces comprising, in combination,

a. one or more evaporation crucibles arranged within a vacuum coater in convenient proximity to receiving surfaces to be coated, said crucibles being elongated and having a plurality of subdivisions delimited by baffles or end plates and crucible side walls;

b. heating means arranged for separately or concurrently vaporizing coating material from all or subdivisions of each crucible as desired;

c. mounting means for receiving and movably holding receiving surfaces in the same or parallel planes within the vacuum coater and conveniently proximate to the crucibles and coating material;

d. supporting means for movably supporting one or more crucibles in the same or parallel planes within the vacuum coater at points below the mounted receiving surfaces; and

e. means for moving one or both of said crucibles and said receiving surfaces within the vacuum coater in a translational manner during coating;

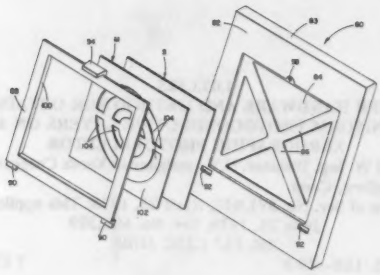
wherein coating of the coating materials or components thereof onto one or the movably mounted receiving surfaces is effected by heating one or more crucibles and moving at least one of said (1) heated crucibles and said (2) receiving surfaces in a translational movement along parallel planes with respect to each other.

4,023,524

TOY SPRAY PAINTING SYSTEM

Adolph E. Goldfarb, Tarzana; Erwin Benkoe, Encino; Delmar K. Everitt, Woodland Hills; Ronald F. Chesley, La Crescenta, and Richard D. Frierdich, Canoga Park, all of Calif., assignors to Adolph E. Goldfarb and Erwin Benkoe, both of Northridge, Calif.

Filed Feb. 12, 1976, Ser. No. 657,459
Int. Cl.² B05B *15/04*; A63H *33/30*; B05C *17/08*; B05B *7/08*
U.S. Cl. 118—301 **11 Claims**



1. A children's toy manually powered paint spraying system for spraying a paint composition onto a substrate, said spraying system comprising:

a. frame means,

b. a container on said frame means for receiving a liquid paint composition therein, and said container having a generally upright tube which extends down into said container and defines a paint outlet at its upper end,

c. means on said frame means defining a contractible and expandible air chamber capable of expelling air upon reduction in its size and capable of receiving air upon increase in its size,

d. manually powered means on said frame means for causing reduction and increase in the size of said air chamber,

e. means defining an air orifice in communication with said air chamber and capable of generating an exit stream of air under pressure upon reduction of said air chamber size, said paint outlet being located in proximity to said air orifice to cause emission of a portion of the paint composition in said container and to atomize said composition in a moving stream of air passing through said orifice to create a spray of the paint composition,

f. adjustment means on said frame means for regulating the distance between said air orifice and said paint outlet and

g. an easel construction for holding a substrate to receive the sprayed paint composition, said easel construction comprising:

a. an easel frame having a recess to receive a substrate,

b. a stencil capable of being disposed in said recess over said substrate and having open portions to permit said paint composition to be received on said substrate and closed portions to block said paint composition,

c. a retaining frame hingedly mounted on said easel frame to retain said substrate and said stencil in said recess, said retaining frame being shiftable from an open position to a closed position where said substrate and stencil are held in said recess,

d. locking means for removably locking said retaining frame to said stencil frame, and

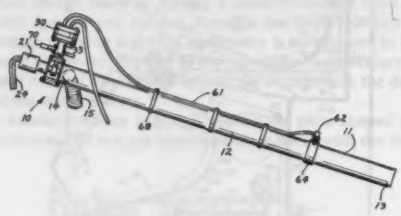
e. a flange means extending from said retaining frame and into said recess to retain and hold said stencil and substrate.

4,023,525

SEED TREATER

Joseph A. Weber, Arlington, Tex., assignor to Gustafson, Inc., Hopkins, Minn.

Filed Aug. 4, 1976, Ser. No. 711,560
Int. Cl.² B05C *5/00*
U.S. Cl. 118—303 **15 Claims**



1. A combined seed conveyor and treater for applying liquid treating material to the seed, comprising:

a screw conveyor having an auger and a drive shaft therefor and an auger tube confining the auger and shaft, the auger tube having a lower seed receiving end and an upper end with a delivery chute from which the grain is discharged;

a metering pump having an impellor moving the liquid treating material through the pump, the pump having a liquid inlet connected to a source of liquid treating material and also having an outlet connected into the auger tube and applying treating liquid to the seed therein from the pump;

a source of rotary power during the auger and drive shaft of the screw conveyor and carrying grain through the auger tube into which the liquid treating material is being applied from the pump; and

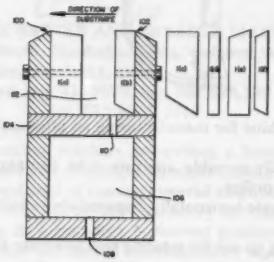
means mechanically connecting the pump impellor to the auger shaft and operating the impellor at a rate directly related to the speed of the auger shaft whereby to move the liquid treating material through the pump and applying the liquid treating material to the seed at a rate related directly to the movement of the seed through the screw conveyor.

4,023,526

APPARATUS FOR APPLICATION OF FOAM TO A SUBSTRATE

Donald Harold Ashmus; William Wirt Rankin, and Andrew Tainter Walter, all of Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,433
Int. Cl.² B05C *3/00*; B32B *5/18*
U.S. Cl. 118—410 **10 Claims**



1. A foam application head comprising, in combination, foam distribution means having foam inlet means connected thereto for effecting transfer of foam from foam generating means into said foam distribution chamber means, foam distri-

bution plate means separating said foam distribution chamber means from foam application chamber means said foam distribution plate means having foam distribution holes therethrough to effect movement of foam from said foam distribution chamber means to said foam application chamber means, said foam distribution holes being sufficient in amount and size to create a differential pressure of from 3 to 150 inches of water pressure between said foam distribution chamber and said foam application chamber said foam application chamber means comprising nozzle lips extending angularly from the plane of said foam distribution plate to define a nozzle orifice, said nozzle orifice effecting application of the foam to a substrate travelling across said nozzle orifice, all of said chamber means enclosed at each end by end wall means.

4,023,527

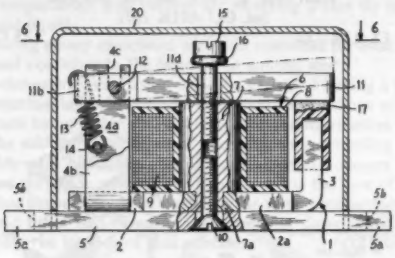
POWDERED TONER DEVELOPING SYSTEM IN XEROGRAPHIC REPRODUCING APPARATUS

John F. DeMayo, Oyster Bay, N.Y., assignor to Sensonics, Inc., Hicksville, N.Y.

Continuation-in-part of Ser. No. 521,537, Nov. 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 411,737, Nov. 1, 1973, Pat. No. 3,863,114. This application Feb. 27, 1976, Ser. No. 662,039

Int. Cl.² G03G *13/08*; B01F *11/00*

U.S. Cl. 118—655 **19 Claims**



1. In xerographic reproduction apparatus, the combination of a xerographic plate, means for supplying powdered toner to said plate comprising a housing, a developer reservoir in said housing, said reservoir containing in a lower portion thereof a developer comprising granular carrier material with powdered toner thereon, means for transporting said granular carrier material with said toner thereon from said reservoir to said plate to which a portion of the toner adhers to form an image, means for returning the granular carrier material and remaining toner to said reservoir, means for intermittently dispensing toner to said reservoir to replenish the toner on said carrier material in said reservoir and transport means, said toner dispensing means comprising a container for toner and metering means controlling the amount of toner intermittently dispensed from said container to said reservoir, tapping means for generating periodic mechanicaltapping impulses comprising a base, an electromagnet disposed on said base and comprising a ferromagnetic core normal to the base and a winding around said core, anvil means on said base at one side of said electromagnet, armature supporting means projecting from said base at the opposite side of said electromagnet from said anvil means, an armature extending diametrically across said electromagnet with a first end portion above said supporting means and an opposite second end portion above said anvil means, pivot means at said first end portion pivotally mounting said armature on said supporting means for movement toward and away from said pole piece of said electromagnet, hammer means on said second end portion of said armature in position to strike said anvil means, said armature being movable about its pivot between a first position in which said hammer means engages said anvil means and a second position in which said hammer means is spaced from said anvil means, said armature being spaced from said pole piece in both of said positions, means biasing said armature in a direction from said first position to said second position, means limiting movement of said armature in said direction, and circuit means for periodically energizing said electromagnet at regular fractional-second intervals to attract said armature and thereby cause said hammer means on said second end of said armature to strike said anvil to generate said periodic mechanical tapping impulses, and means for fixing said base to said toner supplying means for conductively transmitting said periodic mechanical tapping impulses thereto.

4,023,528

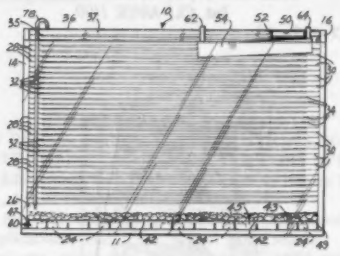
AERATING MEANS

Lyle C. Applegate, P.O. Box 637, Mentone, Calif. 92359

Filed Nov. 24, 1975, Ser. No. 634,926

Int. Cl.² A01K *63/00*

U.S. Cl. 119—5 **10 Claims**



1. Aerating means for an aquarium, comprising:

a relatively thin housing having closely spaced front and rear walls and two narrow side walls; and

internal structure in the housing comprising a plurality of elongate baffles forming a zig-zag passageway above a clear space in the bottom of said housing, each baffle being integral along side edges thereof with said front and rear walls to form a web-like extension therebetween and having a first end integral with one of said side walls and a second end terminating short of the other of said side walls, the joints between the baffle and housing walls being fluid-tight;

said baffles being arranged so as to extend in interlaced relationship from first one and then the other of the side walls of said housing means, each being positioned so as to incline slightly upwardly from said first end to said second end and all but the uppermost one forming, with the next higher baffle, a single leg of said zig-zag passageway, said leg having a restricted entrance at said second end and gradually thereafter expanding as the baffles defining its upper and lower limits diverge because of their opposite directions of inclination,

said housing having at least one opening through at least one wall into the clear space in its bottom for the admission of aquarium water and having, additionally, a port for the introduction of compressed air into said clear space, said housing also having an outlet opening above an upper one of said baffles, near the lower end of that baffle;

said internal structure including means cooperative with said upper one of said baffles, which means can be one of the baffles, to define, with the housing walls, a space above said upper one of said baffles, said space having a restricted entrance between said means and the upper end of said upper one of said baffles;

said aerating means being adapted for use with its housing immersed in the water of an aquarium in such fashion that said outlet opening is above the level of said water, and with a compressed air line attached so as to direct compressed air through said port into said clear space;

whereby the forcing of said compressed air into said clear space, after the aquarium water has filled said housing to substantially the level of the water outside of the housing, results in turbulent upward movement of the air through the water in the zig-zag passageway to thereby provide intimate contact between the air and aquarium water in the zig-zag passageway for efficient aeration of said water; and

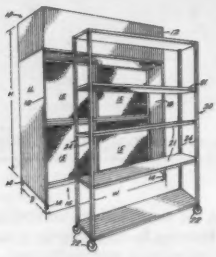
whereby the water in the zig-zag passageway is forced upwardly therethrough by the air until it enters said space through the restricted entrance thereto, then runs down the inclined upper surface of said upper one of said baffles and out of said housing through said outlet opening, from whence it can be returned to the main body of water in the aquarium.

4,023,529

LAMINAR FLOW SYSTEM AND REMOVABLE ANIMAL RACK

Jerome J. Landy, 13700 SW. 78 Court, Miami, Fla. 33158

Filed Nov. 17, 1975, Ser. No. 632,787
Int. Cl.² A01K *1/00*
U.S. Cl. 119—15 **35 Claims**



1. A laminar flow system and removable animal cage racks comprising, in combination,

a vertical air circulation housing having imperforate end walls,

one front wall being essentially a filter,

means defining a plenum chamber behind the filter,

an opening in a top wall to admit ambient air,

a blower beneath the top wall and in air flow coupled relationship to the filter,

means for immovably mounting the housing on a support,

an animal cage rack with transportable means for supporting the same in removable relationship to the filter,

said housing being proportional to pass through a standard door and said rack having a depth permitting passage through a standard door

whereby the entire assembly may be placed in an animal room and the rack removed for washing while the circulatory system remains in fixed position.

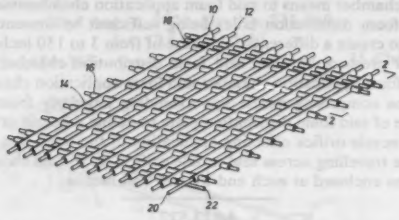
4,023,530

POULTRY CAGE BOTTOM COVER

Richard H. Cobb, Rte. 4, Box 359-A, Hope, Alaska 72203

Filed Jan. 21, 1976, Ser. No. 651,051
Int. Cl.² A01K *31/00*
U.S. Cl. 119—17 **3 Claims**

1. A non-metallic cage bottom grid cover for isolating caged bird inhabitants and their eggs from rust on the wires of the cage bottom and for preventing further rusting of such wires, said cover including curvilinearly rounded longitudinal channel means in a first direction and curvilinearly rounded longitudinal channel means in a second direction intersecting said first channel means for overlaying securement with respective grid-like configured wires in the cage bottom, the openings between said cover channel means permitting waste flushing liquids to pass therethrough and providing the collection of eggs in the cage without contact with the bottom cage wires, and locking tabs within at least some of said channel means for securing said cover to the respective wires of the cage bottom, and wherein the channel means running longitudinal in said



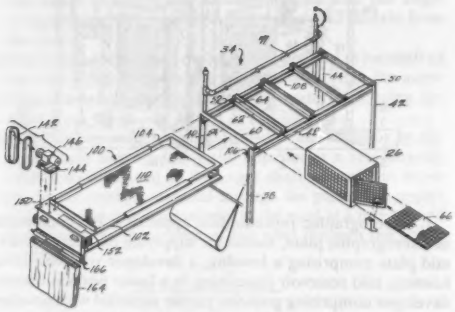
first direction are higher than the channel means running longitudinal in said second grid direction whereby wires of the cage bottom are engaged within respective channel means to prevent lateral shifting of said cover.

4,023,531

ANIMAL WASTE DISPOSAL APPARATUS

John W. Thompson, Timonium, Md., assignor to Wahmann Mfg. Co., Timonium, Md.

Filed Sept. 2, 1975, Ser. No. 609,806
Int. Cl.² A01K *1/01*
U.S. Cl. 119—22 **23 Claims**



1. An automatic waste disposal system for caged animals comprising:

a supporting frame including a pair of rails,

a continuous belt,

means for mounting said belt for endless movement beneath a plurality of animal cages to receive waste from animals in said cages on the outer surface thereof, said mounting means engaging said rails and being slidable along said rails for removal thereof,

means on said mounting means for driving said belt to cause movement of said belt beneath said cages,

scraper means on said mounting means for contacting said outer surface of said belt and remove waste thereon, and

means on said mounting means adjacent said scraper for holding a flexible bag with an open end positioned for receiving waste from said belt.

19. A caging system comprising:

a cage supporting frame for supporting a plurality of animal cages in at least one row and having a pair of separated rails extending below said cages,

a plurality of said cages each having a bottom for permitting waste to drop therethrough,

conveying means disposed below said row including a continuous belt mounted for removing said waste,

means engaging said conveyor means for depositing said waste into a container,

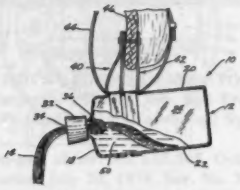
means for mounting said conveying means flange members engaging said pair of rails for sliding movement therealong so as to permit removal of said conveying means and engaging means for washing and/or sterilization.

4,023,532

FACE FLY DEVICE

Roy Goodwin, Rte. 2, Lancaster, Mo. 63548

Filed Apr. 22, 1976, Ser. No. 679,471
Int. Cl.² A01K *29/00*
U.S. Cl. 119—156 6 Claims



1. A face fly device comprising

a container having opposite ends, said container having a compartment area therein for receiving a face fly repellant liquid;

securing means associated with said container for attaching said container to the head of an animal; and

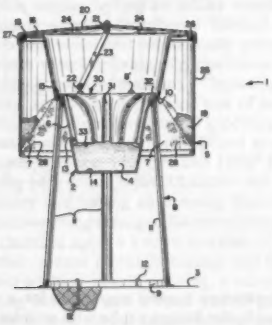
an elongated wick having opposite ends and having a knot intermediate said opposite ends, said knot and one of said ends being within said container for communication with the said fluid, the other of said wick ends extending outside said container and being positioned adjacent said animal's face, whereby said knot restricts the flow of said fluid through said wick while at the same time permitting said other end of said wick to remain damp with fluid from the interior of said container.

4,023,533

PROTECTED FEEDER AND/OR INSECTICIDE APPLICATOR FOR LIVESTOCK

Fred W. Mann, P.O. Box 444, Waterville, Kans. 66548

Filed Dec. 15, 1975, Ser. No. 641,693
Int. Cl.² A01K *29/00*
U.S. Cl. 119—159 9 Claims



1. A combination insecticide applicator and feeder for livestock comprising:

a. a support structure;

b. an open top receptacle having a side wall and a bottom wall, said receptacle being adapted to support a livestock attracting material therein and having a plurality of circumferentially spaced access apertures in said side wall;

c. means on said support structure and on said receptacle to support said receptacle with said access apertures in a selected position above a ground surface;

d. dispensing means having insecticide material therein and supported on said receptacle and surrounding same and spaced from said access apertures in said side wall of said receptacle for dispensing the insecticide material onto livestock in response to engagement thereof by the livestock;

e. a shield depending from said receptacle and positioned to protect said dispensing means from weather;

f. dispensing means providing openings in an upper portion of said dispensing means for introducing insecticide material to said dispensing means;

g. a cover member removably mounted over said shield in covering relation with the open top of said receptacle and said dispensing means for covering and protecting same from weather; and

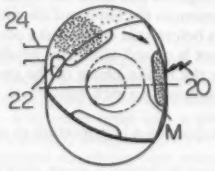
h. resilient means operatively connected to said cover member to retain same in position covering the receptacle and dispensing means.

4,023,534

ROTARY PISTON INTERNAL COMBUSTION ENGINE WITH A STRATIFIED CHARGE INTAKE PORT SYSTEM

Yoshikazu Ishikawa, Chofu, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 433,509, Jan. 15, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,806
Claims priority, application Japan, Jan. 22, 1973, 48-8516
Int. Cl.² F02B *53/04*
U.S. Cl. 123—8.13 2 Claims



1. A rotary piston internal combustion engine comprising:

a housing having a cavity, said housing having a two lobed peripheral wall and two oppositely facing end walls interconnected by the peripheral wall to define the cavity;

a rotary piston rotatably disposed in the cavity to form a plurality of working chambers in cooperation with said housing walls, said rotary piston having sides each of which is formed with a recess that is deeper in the center of each side of said rotary piston;

a peripheral wall having a main intake port opening to the cavity;

one of the two oppositely facing end walls having an auxiliary intake port opening to the cavity, said main intake port being located in front of, and adjacent said auxiliary intake port with respect to the direction of rotation of said piston and both of said intake ports being configured and sized such that both of said intake ports commence to communicate with one of the working chambers and said main intake port is closed after said auxiliary intake port is to complete the intake phase of the working chamber;

means for supplying a rich mixture to said auxiliary intake port;

means for supplying a lean mixture to said main intake port; and

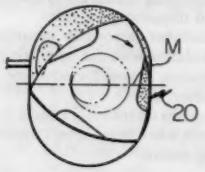
ignition means including a spark plug which is located at a position spaced before the minor axis of the two lobed peripheral wall by a predetermined angular distance from substantially 7 degrees to substantially 8 degrees.

4,023,535

ROTARY PISTON INTERNAL COMBUSTION ENGINE WITH A STRATIFIED CHARGE INTAKE PORT SYSTEM

Yoshikazu Ishikawa, Chofu, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 433,509, Jan. 15, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,920
Claims priority, application Japan, Jan. 22, 1973, 48-8516; Jan. 17, 1973, 48-7701
Int. Cl.² F02B 53/04
U.S. Cl. 123—8.13 2 Claims



1. A rotary piston internal combustion engine comprising:
a housing having a cavity, said housing having a two lobed peripheral wall and two oppositely facing end walls interconnected by a peripheral wall to define the cavity;
a rotary piston rotatably disposed in the cavity to form a plurality of working chambers in cooperation with said housing walls, said rotary piston having sides each of which is formed with a recess that is deeper in the leading half of each side of said rotary piston;
the peripheral wall having an auxiliary intake port opening to the cavity;
one of the two oppositely facing end walls having a main intake port opening to the cavity, both of said intake ports being configured and sized such that said auxiliary intake port commences to communicate with one of the working chambers before said main intake port does and said main intake port is closed after said auxiliary intake port is to complete the intake phase of the one working chamber;
means for supplying a rich mixture to said auxiliary intake port;
means for supplying a lean mixture to said main intake port; and
ignition means including a spark plug which is located at a position spaced beyond the minor axis of the two lobed peripheral wall by a predetermined angular distance from substantially 7 degrees to substantially 8 degrees.

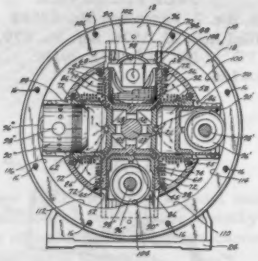
4,023,536

METHOD OF CONTROLLING THE TIMING OF IGNITION IN AN INTERNAL COMBUSTION ENGINE

Ray T. Townsend, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Continuation of Ser. No. 286,189, Sept. 5, 1972, abandoned. This application Jan. 2, 1975, Ser. No. 538,106
Int. Cl.² F02B 3/00; F02M 7/00; F02B 41/00
U.S. Cl. 123—26 15 Claims

1. The method of controlling the timing of ignition in an internal combustion compression engine comprising cylinders, reciprocating pistons, a supply of fuel and air to such cylinders, and wherein said engine has a predetermined maximum operating power capability and a predetermined idling power setting, comprising, introducing combustible fuel into said cylinders, compressing said fuel to combust the same,
determining the conditions of temperature and pressure within at least one of said cylinders at a time period in the engine cycle when the engine is operating at the predetermined ignition timing conditions which are sought to be maintained; said time period being during the time when conditions of temperature and pressure within the cylinder are at less than maximum, and when said engine is operating at between the maximum power capability but at greater than its idling power setting,
intermittently monitoring the conditions of temperature and pressure within said cylinder at the same time period in the engine cycle as said foregoing time period during operation of said engine,



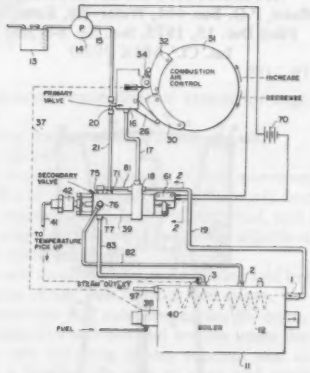
introducing air under pressure into said cylinder during an intake portion of the cycle of said piston within said cylinder, and restoring the predetermined conditions of temperature and pressure to said cylinder when variations in temperature and pressure are detected during said monitoring by adjusting the pressure of air introduced into said cylinder during said intake portion of the cycle of said piston.

4,023,537

TEMPERATURE CONTROL APPARATUS FOR A MONOTUBE BOILER

J. Warne Carter, Sr., 4520 Weeks Park Lane, Wichita Falls, Tex. 76308, and J. Warne Carter, Jr., P.O. Box 684, Burkburnett, Tex. 76354

Filed Apr. 13, 1976, Ser. No. 676,518
Int. Cl.² F22G 5/00; F22B 29/06
U.S. Cl. 122—479 S 16 Claims



1. Temperature control apparatus for a monotube steam-generating boiler having a tube with an inlet end for receiving primary water and an outlet end for providing superheated steam to a utilization device, and having heating means for providing heat to the boiler tube, said apparatus comprising:
a. heat control means for variably controlling the amount of heat provided by the heating means;
b. temperature sensing means for sensing the temperature of the steam generated in the boiler tube at a location adjacent the outlet end where the steam is superheated;
c. a plurality of input points located in the boiler tube up-

stream of the location of the temperature sensing means, one input point being adjacent to the temperature sensing means providing a feedback point;

d. primary water supply means responsive to the heat control means for supplying primary water to the inlet end of the boiler tube in accordance with the amount of heat provided by the heating means; and

e. secondary water supply means responsive to the temperature sensing means for supplying secondary water to each of the input points in accordance with the sensed temperature of the steam and for causing the water supplied to each input point other than the feedback point to be proportional to the water supplied to the feedback input point.

4,023,538

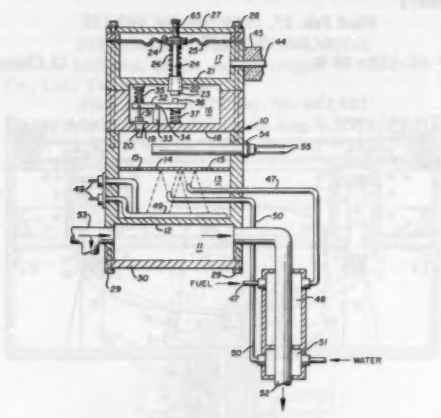
HOT FUEL GAS GENERATOR

Webster B. Harpman, Poland, Ohio, and Fred G. Mahoney, Pittsburgh, Pa., assignors to Econo Fuel Systems, Inc., Latrobe, Pa.

Continuation-in-part of Ser. No. 625,565, Oct. 24, 1975. This application July 30, 1976, Ser. No. 710,195

Int. Cl.² F02B *43/08*

U.S. Cl. 123—3 **7 Claims**



1. A generator for producing superheated fuel gas for an internal combustion engine having an intake manifold, said generator comprising a multi-chambered vertical pressure vessel, at least two horizontal and substantially parallel partitions in said pressure vessel defining said chambers, separate means for simultaneously continuously injecting known amounts of gasoline and water into a first one of said chambers and controlling the amounts thereof, electrical heating means in said first chamber for generating and maintaining surface temperatures between 1600° F. and 1800° F., one of said partitions being between said first chamber and a second one of said chambers and having an opening therein, a first valve element in said opening arranged for movement partially into said second chamber upon a known increase of pressure in said first chamber, means normally biasing said first valve element to a closed position in said opening, a second one of said partitions being between said second one of said chambers and a third one of said chambers and having a secondary opening therein, a second valve element in said secondary opening arranged for movement partially into said second chamber, a diaphragm horizontal disposed in said third chamber, said diaphragm dividing said third chamber into two portions, an extension of said second valve element secured to said diaphragm for movement thereby and means normally biasing said second valve element into closed relation with said secondary opening, tubular means establishing communication between said third chamber and said inlet manifold, said tubular means communicating with the third chamber between said diaphragm and said second partition, said diaphragm being movable responsive to pressure changes in said inlet manifold so as to move said second valve element toward said second chamber when said manifold pressure drops.

4,023,539

FUEL-REFORMING DEVICE FOR INTERNAL COMBUSTION ENGINES

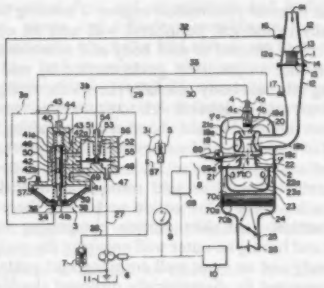
Masaaki Noguchi, Nagoya; Tsuchio Bunda, Okazaki; Masaharu Sumiyoshi, Toyota, and Yasuo Kondo, Anjo, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Dec. 8, 1975, Ser. No. 638,853

Claims priority, application Japan, Dec. 11, 1974, 49-142718

Int. Cl.² F02B *43/08*

U.S. Cl. 123—3 **18 Claims**



1. An air fuel mixture supplying system for an internal combustion engine having a combustion chamber to which said supplying system supplies the mixture and which is defined by a cylinder, a cylinder head and a piston operably disposed within said cylinder, comprising:

a main air fuel mixture supplying pipe connected to the adjacent atmosphere at one end thereof and said combustion chamber at another end thereof;

a main fuel supplying device for supplying the fuel into said main pipe wherein the fuel is mixed with air introduced from the adjacent atmosphere;

an auxiliary air fuel mixture supplying pipe connected to the adjacent atmosphere at an end thereof and said combustion chamber at the another end thereof and disposed parallel said main pipe;

means for metering the air flow through said auxiliary pipe and generating a pneumatic signal corresponding to the air flow;

a fuel reforming device disposed at downstream of said metering means and in said auxiliary pipe, said fuel reforming device having another combustion chamber connected to said auxiliary pipe at the downstream of said air flow metering means, means for injecting the fuel into said another combustion chamber, means for igniting the mixture of the air and the fuel introduced and means for generating a recirculation flow in said another combustion chamber, so as a portion of the mixture ignited to be burned is recirculated to thereby be mixed with the air and the fuel newly introduced into said another combustion chamber;

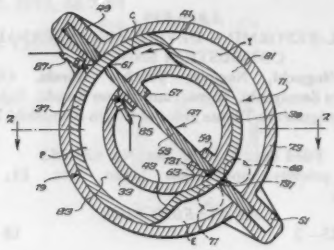
a fuel source for supplying the fuel; and

means for controlling the fuel flow to be supplied to said fuel injecting means in accordance with said pneumatic signal thereby the air fuel ratio of the air fuel mixture in said another combustion chamber being kept at predetermined value.

4,023,540
ROTARY ENGINE

Hans Zollenkopf, 4085 Montcalm Crescent, Niagara Falls, Ontario, Canada (L2G 6M1)

Filed Apr. 15, 1976, Ser. No. 677,398
Int. Cl.² F02B 53/00
U.S. Cl. 123—8.43 9 Claims



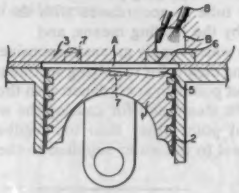
1. In an internal combustion engine: a housing body having a generally cylindrical peripheral wall and an open end; a housing cover secured to said body and substantially closing said open end; a cylindrical guide carried by said cover and projecting into said body coaxially therewith; said guide being spaced from said peripheral wall to provide an annular chamber; a rotor mounted in said chamber and engaging the peripheral wall of said body and said guide; a shaft journaled in said body and said guide for rotary movement, said shaft being non-rotatably secured to said rotor concentrically thereof; said rotor having a skirt portion projecting therefrom in an axial direction, said skirt portion comprising two arcuate portions and having an outer wall engaging the peripheral wall of said body and an inner wall engaging said guide, said walls being connected by diametrically disposed sloping cam portions of said skirt; a transverse slide extending diametrically of said housing body and having longitudinally spaced slots therein, said skirt portion being engaged in said slots and being adapted to reciprocate said slide by means of said sloping cam portions as said rotor rotates; said slide and said sloping cam portions dividing said annular chamber into sub-chambers in which a combustible gas mixture may be compressed and ignited, whereby force is exerted on said sloping cam portions to rotate said rotor and shaft; first means which communicates with said annular chamber for supplying fuel thereto and second means which communicates with said annular chamber for exhausting combustion products therefrom.

4,023,541
COMBUSTION CHAMBER FOR INTERNAL-COMBUSTION ENGINE

Akehiro Sakamoto, Chiryu, and Yoshio Watanabe, Ohbu, both of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Mar. 12, 1973, Ser. No. 340,106
Claims priority, application Japan, Mar. 17, 1972, 47-27632; May 23, 1972, 47-50921; May 23, 1972, 47-50922
Int. Cl.² F02B 19/10
U.S. Cl. 123—32 E 9 Claims

1. In an internal-combustion engine of the compression ignition liquid fuel injection type having a cylinder, at least one piston reciprocative in the cylinder, a cylinder head disposed on the cylinder, a combustion chamber defined by the cylinder, the lower surface of the cylinder head and the upper surface of the piston, said lower surface and said upper surface constituting wall portions of said combustion chamber, a prechamber provided in the cylinder head so as to be in communication with the combustion chamber through a throat and into which a stream of fuel is directed, a wedge-shaped rectangular concavity provided in the upper surface of the piston in communication with the combustion chamber; the improvement comprising an air reservoir formed in one of the wall portions of the combustion chamber and spaced from the wedge-shaped rectangular concavity, the air reservoir being open at a maximum diameter portion thereof to the combustion chamber, whereby the air reservoir fills with compressed

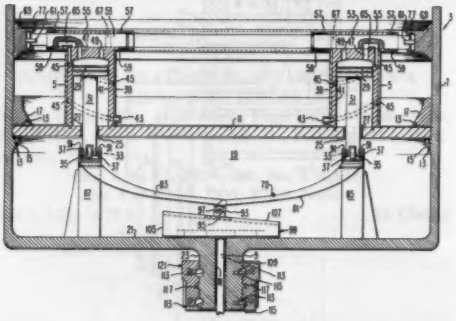


fresh air during a compression stroke of the engine and issues the compressed fresh air into the combustion chamber during a power stroke of the engine to promote complete combustion.

4,023,542
LOAD RESPONSIVE VARIABLE STROKE INTERNAL COMBUSTION ENGINE

Alvino J. Ango, 1252 Elliott St., Madison Heights, Mich. 48071

Filed Feb. 27, 1976, Ser. No. 662,155
Int. Cl.² F02B 75/26
U.S. Cl. 123—58 R 22 Claims



17. Improved means for use in a circularly configured stationarily mounted four cycle internal combustion engine whereby the length of the intake strokes of the cylinders is automatically varied according to the torque load that is applied to the output drive thereof, said length of the intake strokes being maximized upon the application of a torque load to said output drive and minimized upon the absence of any such torque load, said improved means comprising:

a. a rotatably mounted drive drum encircling the cylinders, pistons and connecting rods of said engine and having a hollow exterior hub disposed in parallel relationship therewith, said exterior hub defining the axis of rotation of said drive drum,

b. movable track means securably supported adjacent an interior webbed surface of said drive drum in transverse relationship with the axis of rotation thereof, said movable track means being formed of two pairs of interconnected declining slope track quadrants that alternately present a pair of oppositely disposed high contact surfaces and a pair of oppositely disposed low contact surfaces to each of said connecting rods, each pair of declining slope track quadrants being pivotally anchored to said interior webbed surface of the drive drum at the apex of a corresponding high contact surface, the free ends of said declining slope track quadrants defining said oppositely disposed low contact surfaces being movable a

predetermined distance toward and away from said interior webbed surface,

c. torque responsive means associated with said hollow exterior hub and with said interior webbed surface and effective for variably positioning said pair of low contact surfaces of said movable track means, said means being effective in response to the presence of a torque load on said exterior hub to position said low contact surfaces at a first relatively short distance from said interior of webbed surface, and effective in response to the absence of a torque load on said exterior hub to position said low contact surfaces at a second relatively greater distance from said webbed surface, and

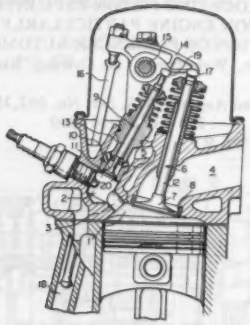
d. means associated with said movable track means and with each of said connecting rods effective for applying a displacing force against one of said high contact surfaces during the power stroke of an associated cylinder, for pushably applying a retracting force against a said connecting rod during the compression and exhaust strokes of an associated cylinder, and for pullably applying an extending force to said connecting rod during the intake stroke of an associated cylinder.

4,023,543

INTERNAL COMBUSTION ENGINE

Yoshikazu Ishikawa, Chofu, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Aug. 7, 1975, Ser. No. 602,892
Claims priority, application Japan, Aug. 9, 1974, 49-91243
Int. Cl.² F02M *19/10*
U.S. Cl. 123—75 B **1 Claim**



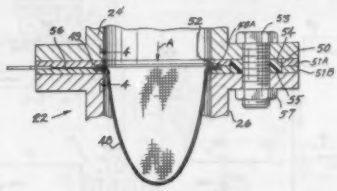
1. An internal combustion engine comprising a main combustion chamber; an auxiliary combustion chamber; a torch nozzle interconnecting the main and auxiliary combustion chambers; a main induction passageway extending to the main combustion chamber; an auxiliary induction passageway extending to the auxiliary combustion chamber; a main inlet valve through which the main induction passageway is selectively openable; an auxiliary inlet valve through which the auxiliary induction passageway is selectively openable; a valve operating mechanism including a rocker arm to operate the main inlet valve; the auxiliary inlet valve having a valve seat and a valve head engageable with the valve seat, the auxiliary inlet valve being operated by the rocker arm such that the valve head lifts from the valve seat; and a cylindrical wall extending from the valve seat downstream thereof, the cylindrical wall being engageable with the valve head of the auxiliary inlet valve to prevent the auxiliary induction passageway from being open until the valve head has been lifted by a predetermined amount, whereby the main inlet valve opens and closes the main induction passageway before and after, respectively, the auxiliary inlet valve opens and closes the auxiliary induction passageway.

4,023,544

PRECOMBUSTION CONDITIONING DEVICE FOR INTERNAL COMBUSTION ENGINES

James D. Cole, Dundee, Ill., assignor to F. D. Farnum Co., Lyons, Ill.

Filed Feb. 14, 1975, Ser. No. 549,947
Int. Cl.² F02M *29/00*
U.S. Cl. 123—119 E **8 Claims**



1. In an internal combustion engine fired by a vaporizable liquid hydrocarbon fuel and air mixture and including, in combination, piston and cylinder assemblies within the engine, a carburetor to which the fuel and air are to be supplied to provide the fuel air mixture, said carburetor having an outlet, an engine intake manifold connected between the carburetor and the engine and defining a passageway for forming a fluid flow path for conducting the fuel-air mixture to the engine piston and cylinder assemblies from the carburetor to said assemblies, said manifold hving an inlet connected to the outlet of the carburetor, whereby the fuel-air mixture passes into the manifold, and means for igniting the fuel-air mixture when supplied to said assemblies to drive the engine, the improvement wherein:

the passageway is defined by electrically conductive surfaces,

and including means for electric contact charging the liquid fuel particles of the fuel air mixture in passing through the passageway and comprising:

a gasket of electrically insulating material secured about said passageway in circumambient relation thereto.

a screen formed from electrically conductive material supported by, and electrically insulated from the carburetor and manifold by said gasket, and extending across said passageway in screening relation to the full bore defined by same coextensively of and across the width of said fluid flow path within the manifold,

said screen having a mesh size lying in the range of from about 10 to about 30,

said igniting means including battery means externally of said engine having a positive terminal and a negative terminal,

with the positive terminal of the battery means being electrically connected to said screen and the negative terminal of said battery means being electrically connected to said electrically conductive surfaces,

said battery means including means for providing a direct current positive charge through said electrical connections to said screen, coextensively of said screen, relative to said surfaces lying in the range of from about 2 to about 25 volts,

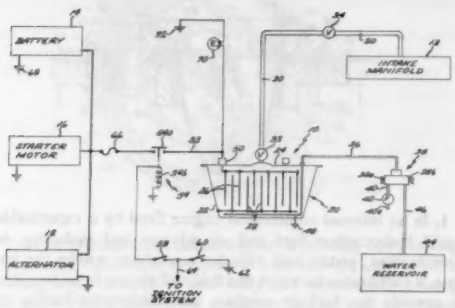
whereby when said engine is operated and the fuel-air mixture moves from the carburetor through said passageway, the liquid fuel particles of said mixture are contact charged positively by engagement with said screen across the full width of said path for electrostatic attraction to and impingement against said surfaces for effecting electrostatically and by impact effect a high surface to volume ratio for such particles for maximumized evaporation effect,

and whereby cleaning of said surfaces of engine deposits thereon is effected.

4,023,545
ENERGY MEANS FOR INTERNAL COMBUSTION ENGINES

Edward G. Mosher, 2462 Transit Ave., Anaheim, Calif. 92804, and John T. Webster, 2436 Greenleaf Ave., Anaheim, Calif. 92801

Filed Jan. 24, 1975, Ser. No. 543,667
Int. Cl.² F02M *27/00*
U.S. Cl. 123—119 E **4 Claims**



1. Energy means for use with an internal combustion engine having a source of electrical energy and an intake manifold for admitting combustion support means to said engine, comprising in combination.

an electrolysis unit connected in circuit with said source of electrical energy to generate hydrogen gas and oxygen gas, said electrolysis unit comprising a tank having at least one cathode attached to said tank internally thereof, said cathode and said tank being connected to the negative side of said source of electrical energy, and at least one anode placed internally of said tank and spaced from contact with said tank and said cathode and connected to the positive side of said source of electrical energy, said tank being substantially filled with a solution of electrolyte and water, whereby application of said electrical energy to said anode and to said cathode may cause generation of hydrogen gas and oxygen gas from the water;

air conduit means extending into said tank beneath both said anode and said cathode such that bubbles of air from said cathode may float upwardly immediately adjacent said anode and said cathode to assist in removing said generated gases from said anodeand said cathode; and

gas conduit means interconnecting said tank and said engine intake manifold to conduct said hydrogen and oxygen gases to said manifold.

4,023,546
DISTRIBUTOR FOR AN INTERNAL COMBUSTION ENGINE

Kazuhiko Kawakami, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Feb. 3, 1976, Ser. No. 654,965
Claims priority, application Japan, Feb. 3, 1975, 50-13436
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 DS **16 Claims**

1. A distributor comprising:

a shaft which rotates according to the rotation of an engine,

a distributor rotor which is mounted on one end of said shaft,

a housing in which said shaft is provided,

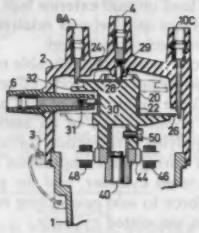
a cap which is mounted on said housing and in which said distributor rotor is provided,

a first central terminal which is provided at an upper surface of said cap,

first stationary terminals which are arranged in said cap along the circumference of a circle surrounding said first central terminal,

second stationary terminals which are arranged in said cap concentrically with said first stationary terminals around said first central terminal,

a first rotor terminal which is provided at an upper part of said distributor rotor, which is electrically connected with said first central terminal, and which radially extends towards said first stationary terminals,



a slip ring which is provided on a side portion of the outer periphery of said distributor rotor,

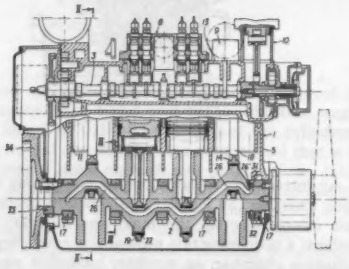
a second rotor terminal which is electrically connected with said slip ring and which extends towards said second stationary terminals, and

a second central terminal which is mounted on a side surface of said cap and which is electrically connected with said slip ring of said distributor rotor.

4,023,547
RECIPROCATING-PISTON-TYPE INTERNAL COMBUSTION ENGINE PARTICULARLY FOR THE OPERATION OF PASSENGER AUTOMOBILES

Josef Reisacher, Weinstrasse, 18 Ostring, Kirchheim, Germany

Filed Aug. 6, 1975, Ser. No. 602,251
Int. Cl.² F01M *1/00*
U.S. Cl. 123—196 R **4 Claims**



1. A reciprocating-piston-type internal combustion engine comprising:

a cylinder head;

a crankcase having an upper portion integrally casted with said cylinder head;

a plurality of main bearings having first bearing surfaces, each of said main bearings including a bearing block having similar upper and lower portions;

a crankshaft mounted within said main bearings and having second bearing surfaces;

connecting rods supported on said second bearing surfaces of said crankshaft;

said crankshaft having ducts through which lubricating oil is supplied to said second bearing surfaces for the connecting rods and additional ducts terminating at said first

bearing surfaces of said main bearings and serving for the supply of lubricating oil to said first bearing surfaces;

said crankshaft further having a cavity extending at least from one end to the other end of said main bearings and connected with said ducts leading to said second bearing surfaces for said connecting rods and to said first bearing surfaces of said main bearings;

a stationary annular groove located in the vicinity of one of said first bearing surfaces of said main bearing at one end of said crankshaft and being supplied with lubricating oil;

said crankshaft having a further duct permanently connecting said cavity of said crankshaft with said annular groove;

said crankcase having a surface of attachment on its upper portion, said attachment surface terminating in the area of said second bearing surfaces above said crankshaft; and,

said bearing blocks being flanged to said attachment surface.

4,023,548

LUBRICATING DEVICE FOR INTERNAL COMBUSTION ENGINES

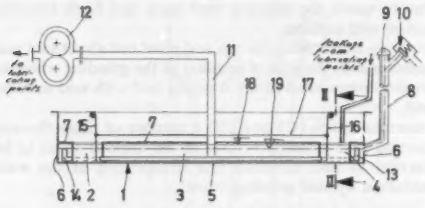
Johann Prasch, Sindorf, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Sept. 5, 1974, Ser. No. 503,491

Claims priority, application Germany, Sept. 6, 1973, 2344949

Int. Cl.² F02M *1/00*

U.S Cl. 123—196 CP **11 Claims**



1. A lubricating device for an internal combustion engine for securing the oil supply to the points to be lubricated, also in greatly inclined positions of said device, which includes in combination: a longitudinal oil pan comprising a closed main chamber, a first open auxiliary chamber arranged near one end of said oil pan, and a second open auxiliary chamber arranged near the other end of said oil pan, the major portion of said main chamber being located between said first and second auxiliary chambers, said main chamber also including a space between each of said auxiliary chambers and the respective adjacent end wall of said oil pan; single pressure pump means having a pressure side for connection with an oil conveying line leading to points to be lubricated, said pressure pump also having a suction side, first conduit means establishing communication only between said suction side and the interior of said closed main chamber; second conduit means leading from the space between one of said open auxiliary chambers and the adjacent end wall of said oil pan to the other one of said open auxiliary chambers, and third conduit means communicating on one hand with one of said auxiliary chambers and on the other hand being adapted to communicate with said main chamber.

4,023,549

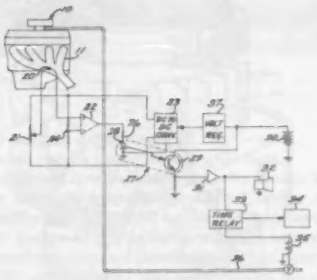
EXHAUST TEMPERATURE MONITORING SYSTEM

John T. Hewitt, 1021 Camino Real, Redondo Beach, Calif. 90277

Filed May 23, 1975, Ser. No. 580,323

Int. Cl.² F02B *77/08*

U.S. Cl. 123—198 D **10 Claims**



1. An exhaust temperature monitoring system for use in a vehicle having an exhaust manifold, comprising:

thermocouple means having dual electrical leads and adapted for thermal contact with said manifold for producing a thermocouple electrical signal across said leads corresponding to the temperature of said manifold;

a voltage reference circuit having two reference lines for producing a ground isolated reference signal independent of the vehicle ground between said two reference lines;

first division means connected across said reference signal lines and to one lead of said thermocouple means for applying a first preselected ratio of said ground isolated reference signal to one lead of said thermocouple means:

second division means connected across two reference lines for producing a second preselected ratio of said ground isolated reference signal;

differential summing means connected to the other lead of said thermocouple means and to said second division means for producing a ground isolated output signal indicative of the differential between the signal combination of said thermocouple electrical signal combined with said first ratio of said ground isolated reference signal and said second ratio of said ground isolated reference signal;

optical coupling means for receiving said ground isolated output signal from said thermocouple means and for generating a responsive output signal at a potential with respect to ground; and

audio alarm means operatively connected to said optical coupling means for producing an audio signal when said differential summing means producing an output signal of a predetermined polarity.

4,023,550

ENGINE WITH OVERSPEED PREVENTION

George F. Houston, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Continuation-in-part of Ser. No. 500,862, Aug. 27, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,780

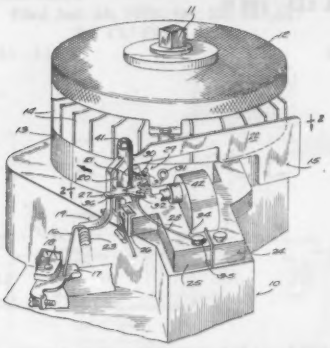
Int. Cl.² F02B *77/00*; F02D *31/00*

U.S. Cl. 123—198 D **19 Claims**

1. In an engine equipped with a governor of the type wherein a governor spring operatively connected with the engine throttle valve, imparts an opening force thereto in opposition to a closing force applied by air pressure produced by an engine driven fan acting on pressure responsive means also operatively connected with the throttle valvel, so that the governed speed of the engine is that at which said opposing forces balance, the improvement by which overspeeding of the engine is precluded, which improvement comprises:

A. normally inactive engine speed reducing means;

B. a centrifugally responsive actuator on a rotating part of the engine to travel in a defined circular orbit as long as the speed of the engine does not exceed a predetermined rate, but projectable by centrifugal force beyond said orbit when engine speed exceeds said predetemined rate; and



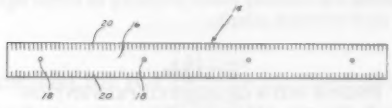
C. activating means including a trigger positioned to be moved by collision therewith of said centrifugally responsive actuator when the latter is centrifugally projected, and operatively connected with said engine speed reducing means to effect activation of the same when said trigger is thus moved.

4,023,551

BOW STRING SILENCER

Marvin J. Huddleston, 485 W. Peak View Ave., Littleton, Colo. 80120

Filed Aug. 25, 1975, Ser. No. 607,240
Int. Cl.² F41B 5/00
U.S. Cl. 124—92 10 Claims



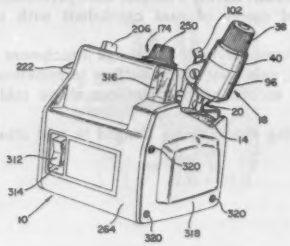
1. An archery bow string silencing device adapted to be mounted on a bow string and reduce the acoustical energy or noise generated in the course of throwing an arrow comprising a relatively flat, flexible body portion of small volume and weight, means defining a plurality of energy transfer areas spaced along said flexible body portion and engageable with spaced portions of a bow string and operable to transfer energy from several locations along a bow string to said body portion, and a plurality of discrete energy dissipating members in energy transfer relationship with and projecting from said body portion, each of said members being connected at one end to said body portion and the opposite end being free to move relative to said body portion to dissipate the energy transferred thereto from said body portion.

4,023,552

METHOD OF DRESSING THE GRINDING WHEEL IN A SHARPENER FOR TWIST DRILLS

Robert Gordon Moores, Jr., Cockeysville, and Richard Eugene Walton, II, Baltimore, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Division of Ser. No. 456,946, April 1, 1974, Pat. No. 3,930,342. This application Sept. 12, 1975, Ser. No. 612,911
Int. Cl.² B24B 1/00, 53/04
U.S. Cl. 125—11 NT 1 Claim



1. A method of dressing the grinding wheel in an apparatus used for grinding the leading ends of twist drills or the like, said apparatus including a grinding wheel mounted in the apparatus and holding means mounted on a pivot rod and operable to hold the leading end of twist drills or the like in engagement with the grinding surface of the grinding wheel for movement across and parallel to said surface along a direction line defined by the pivot rod, the holding means and pivot rod being rotatable about an axis transverse to the axis of rotation of the grinding wheel for adjusting the position of the holding means to the gradual wear sustained by the grinding wheel, said method comprising the following steps:

A. rotating the grinding wheel about its axis of rotation;

B. positioning a dressing tool in said holding means;

C. linearly moving the holding means along said direction line to move the dressing tool back and forth laterally across said surface;

D. rotating said holding means and pivot rod about said axis transverse to the axis of rotation of the grinding wheel to ensure engagement of the dressing tool with said surface; and,

E. repeating steps (C) and (D) a number of times thereby causing said grinding surface to be dressed so as to be parallel to said direction line irrespective of the wear sustained by said grinding wheel.

4,023,553

COMBINATION CHARCOAL LIGHTER AND MINIATURE GRILL

Charles E. London, 4976 Skyline Road South; William R. Tomison, 260 W. Vista South, both of Salem, Oreg. 97302, and Roscoe C. Nelson, III, 2108 SW. Laurel St., Portland, Oreg. 97201

Filed July 28, 1975, Ser. No. 599,373
Int. Cl.² A47J 37/00
U.S. Cl. 126—25 B 6 Claims

1. A charcoal lighter comprising:

a. a tubular housing,

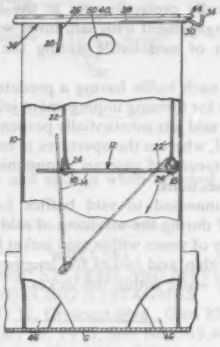
b. draft means in the lower portion of the tubular housing,

c. grate means for releasably supporting charcoal thereon,

d. hanger means including grate pivot means connected pivotally at the lower end thereof to the grate means for pivoting the grate means about a horizontal axis, and connected at the upper end thereof to the upper portion of the tubular housing for locating the grate means intermediate the ends of the housing,

e. the hanger means including a grate-releasing hanger member connected pivotally at its lower end to the grate

means at a position spaced from said horizontal axis and having a hook portion at its upper end releasably overlying the upper edge of the tubular housing, the grate-releasing hanger member being operable, when said hook portion overlies the upper edge of the housing, to support



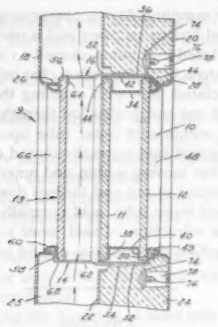
the grate means horizontally within the housing, and when said hook portion is released from said upper edge of the housing, to allow downward pivoting of the grate means about said horizontal axis to discharge charcoal therefrom.

4,023,554

SELF-CONTAINED WINDOW UNIT FOR OVEN DOORS

Joseph W. Katona, Walled Lake, Mich., assignor to Mills Products, Inc., Farmington, Mich.

Filed Feb. 12, 1976, Ser. No. 657,472
Int. Cl.² F23M 7/04
U.S. Cl. 126—198 13 Claims



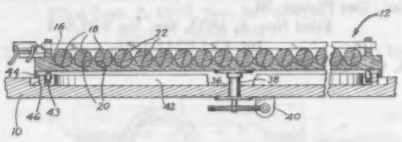
1. A self-contained window unit adapted to be assembled into an oven door having front and back panels with aligned window openings therein and means defining an air passage to allow air to flow upwardly through the door and window unit therein, comprising a window sub-assembly having a pair of glass panes, means to hold said panes in spaced parallel relation, a third glass pane, and means for releasably securing said third glass pane to said window sub-assembly in a position at one side thereof and in spaced parallel relation to the adjacent glass pane of said sub-assembly, said securing means comprising a plurality of individual mounting clips attached to said holding means which are spaced apart so as to provide areas between said third pane and said adjacent pane of said sub-assembly at the top and bottom of said window unit defining openings communicating with the air passage in the door to allow the air to flow upwardly therebetween.

4,023,555

SOLAR HEATING DEVICE

Paul F. Bailey, 511 SW. 10th Ave., Portland, Oreg. 97205

Filed Apr. 5, 1976, Ser. No. 673,599
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 10 Claims



1. In solar heating apparatus,

heat collector means for collecting solar heat,

a canopy disposed over said heat collector means including multiple elongate cylindrical reflector bodies disposed substantially parallel to one another in said canopy, said reflector bodies having reflector surfaces extending axially therealong disposed internally thereof operating to reflect the sun's rays so that such pass to the collector means, and

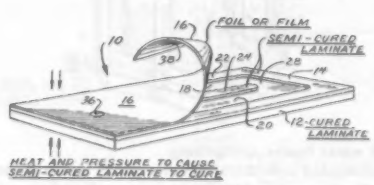
means for adjusting said reflector bodies by rotating them about their axes whereby to compensate for a change in the angle of incidence of the sun's rays against the reflector surfaces in the passage of such rays toward the collector means.

4,023,556

LAMINATED ABSORBER MEMBER FOR FLAT PLATE SOLAR COLLECTOR AND METHOD OF MAKING SAME

Richard George Sarazin, Onalaska, and Larry Dale Olson, Viroqua, both of Wis., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed May 27, 1975, Ser. No. 581,250
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 6 Claims



1. A flat plate absorber member for a solar collector comprising an insulating, self-supporting, glass epoxy laminate substrate, said substrate containing one or more wide, shallow channels formed in an upper flat surface thereof and having a thickness under said channels of about 0.030–0.125 inches, a thin, flat, heat absorbing sheet bonded to said substrate in areas surrounding all of said channels so as to close the top of said channels, and at least a pair of openings in said absorber member having inlet and outlet fittings attached thereto for permitting liquid to flow through said channels.

4,023,557

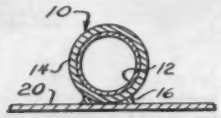
SOLAR COLLECTOR UTILIZING COPPER LINED ALUMINUM TUBING AND METHOD OF MAKING SUCH TUBING

John K. Thorne, Crystal Lake, Ill.; Gary L. Province, and Clyde W. Siltanen, both of Decatur, Ala., assignors to UOP Inc., Des Plaines, Ill.

Filed Nov. 5, 1975, Ser. No. 628,864

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 **1 Claim**



1. In a solar collector panel of the type including a generally flat aluminum plate absorber member having tubing bonded to it for carrying a heat transfer fluid to and from the panel, the improvement wherein said tubing is a composite comprising an inner copper tube bonded to an outer aluminum tube, said tubing having a wall thickness comprising no greater than 50% copper with the wall thickness of the copper portion being no greater than about 0.020 in.

4,023,558

WATER HEATER

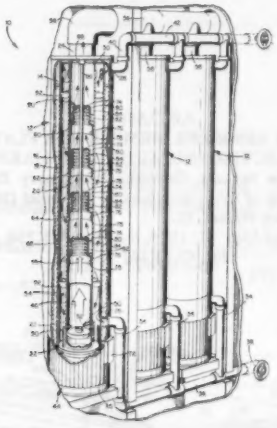
Lazaros J. Lazaridis, Lincoln, Mass., assignor to Thermo Electron Corporation, Waltham, Mass.

Filed July 28, 1975, Ser. No. 599,736

Claims priority, application United Kingdom, July 31, 1974, 33810/74

Int. Cl.² F22B *7/00*

U.S. Cl. 126—391 **1 Claim**



1. A water heater, comprising:

an elongated cylindrical annular water jacket to be vertically disposed and having an inner wall and an outer wall and means to circulate water through said jacket from the top of said jacket to the bottom;

a source of forced hot gas;

a conduit formed by said inner wall for conveying hot gas from said source through the heater from the bottom to the top thereof, said inner wall being the sole and direct means of separation between the water and the hot gas and thereby forming a heat transfer wall;

a series of baffles centrally disposed within said conduit positioned to divide said conduit into a plurality of sections disposed longitudinally and sequentially in said conduit, said baffles being cylindrically shaped and smaller in diameter than said conduit, the wall of each said cylindrical baffle being substantially parallel to said inner wall, said baffle having a closed end disposed towards the top of said heater and an open end disposed towards the bottom of said heater, said baffles also having an outwardly protruding lip at the bottom thereof for sealing engagement with said inner wall only by thermal expansion of said baffle during the operation of said heater;

the wall of each baffle having a predetermined number of apertures for forming impingement jets of hot gas and for directing said jets substantially perpendicular against said inner wall, wherein the apertures in each baffle represent the sole means of gaseous communication between sequential sections;

a rod connected to said baffles for unitary removal thereof during the servicing of said heater; and

a plurality of vanes within said jacket for deflecting water flow within said jacket for lengthening the path traveled by water within the jacket.

4,023,559

SAMPLING CATHETER DEVICE

John Anthony Gaskell, Box Hill, Australia, assignor to Smith & Nephew (Australia) Pty. Limited, Australia

Filed Jan. 22, 1976, Ser. No. 651,226

Claims priority, application Australia, Jan. 28, 1975, 0376/75

Int. Cl.² A61M *25/00*; **A61B** *10/00*

U.S. Cl. 128—2 W **3 Claims**

1. A catheter sampling device comprising an outer tube of resilient material having an open and a normally closed end, said normally closed end being shaped so as to permit unrestricted entry into a body through a channel thereof and having means associated therewith enabling the opening of said normally closed end and protrusion therethrough by an inner tube extending within said outer tube upon said inner tube being pushed against said normally closed end and a flexible elongated member moving within said inner tube having sample collecting means at the end thereof designed to enter the body beyond said inner tube, said normally closed end being reclosable upon retraction of said inner tube and elongated member back within the confines of said outer tube.

4,023,560

FEMALE URINARY DEVICE

James Robert Cade, 529 NW. 58th St., Gainesville, Fla. 32601, and James D. Raulerson, Rte. 2, Box 104, Alachua, Fla. 32615

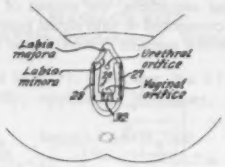
Filed Feb. 2, 1976, Ser. No. 654,986

Int. Cl.² A61B *19/00*

U.S. Cl. 128—2 F **13 Claims**

12. A urinary device for obtaining a generally uncontaminated urine specimen from a female comprising a unitary member which includes a vaginal insertable portion and two arm portions, said insertable portion being resiliently bendable and generally U-shaped when relaxed with generally parallel side legs extending from a curved leading end joining said legs, each side leg being joined to a respective arm portion remote from said leading end, said member being resiliently manually bendable from said relaxed shape to bring said legs toward each other for ready insertion of said insertable portion into a vaginal orifice and to bring said arm portion

toward each other, said insertable portion resiliently urging said arm portions apart and into contact with and spreading



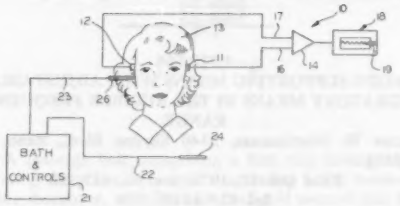
apart labia minora and majora when inserted and manually released.

4,023,561

WATER CALORIC SYSTEMS AND METHODS FOR INDUCING NYSTAGMUS

Gerald H. Servos, 21 W. Crescent Blvd., Glen Ellyn, Ill. 60137

Filed Apr. 18, 1975, Ser. No. 569,442
Int. Cl.[2] A61B 5/10
U.S. Cl. 128—2.1 R 2 Claims



1. A liquid caloric system for inducing nystagmus in patients,

said system comprising bath means for storing liquids to be delivered to the patient's ear for inducing nystagmus, patients,

said bath means comprising a pair of air tight liquid containers,

air pressure means for forcing the liquid from each of the containers,

said air pressure means comprising a control section common to both of said containers,

means for coupling said common control section to external sources of compressed air commonly available in physicians offices,

said common control section comprising air pressure control means for controlling the actual air pressure delivered to said container,

means for heating the liquid in at least one of said containers,

said means for heating the liquid including means for monitoring and controlling the temperature of the liquid,

air tube means separately coupling air under pressure from said common control section to each of said containers,

said air tube means comprising at least one tube extending to and along the bottom of said at least one container,

said one tube having perforations therein to enable air under pressure to escape from the tube to agitate the liquid and assure equal temperature throughout the heated bath,

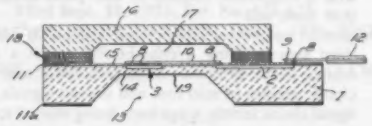
air tube valve means in said air tube means to cause air to selectively flow to the extension along the bottom of said container or to exit the one tube at the top of the liquid, and delivery tubes attached to each of the containers for delivering the liquids to the ears of patients at controlled rates regardless of the position of the delivery tubes relative to the height of the containers.

4,023,562

MINIATURE PRESSURE TRANSDUCER FOR MEDICAL USE AND ASSEMBLY METHOD

Jaroslav Hynecek, Bedford; Wen H. Ko, Cleveland Heights, and Eugene T. Yon, Lyndhurst, all of Ohio, assignors to Case Western Reserve University, Cleveland, Ohio

Filed Sept. 2, 1975, Ser. No. 609,382
Int. Cl.[2] A61B 5/02
U.S. Cl. 128—2.05 E 10 Claims



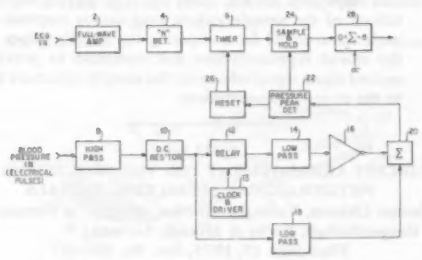
1. A transducer for measuring fluid or pneumatic pressure comprising a semiconductor base member, at least a portion of said base member being a thin flexible diaphragm, a piezoresistive bridge formed on a surface of a side of said diaphragm, said bridge having at least one electrical parameter which changes in response to flexing of said surface of said diaphragm, a cover member, a seal bonding said cover member to said base member, said members and said seal defining a fluidtight chamber containing said piezoresistive bridge, and electrical conductor means extending from said piezoresistive bridge to a point external to said fluidtight chamber, said conductor means including diffused conductor paths on said base member where said conductor means passes from said fluidtight chamber to said point external to said fluidtight chamber.

4,023,563

APPARATUS AND METHOD FOR DETERMINING ONSET TIMES OF PULSES AND USE THEREOF IN COMPUTING INTERARTERIAL BLOOD PRESSURE ELECTROMECHANICAL INTERVAL

Charles A. Reynolds, West Haven; Richard A. Mentelos, Hamden, both of Conn., and Donald E. Lewis, San Gabriel, Calif., assignors to American Home Products Corporation, New York, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,305
Int. Cl.[2] A61B 5/02
U.S. Cl. 128—2.05 R 17 Claims



1. Apparatus for determining the time of onset of an electrical pulse measured from a reference time comprising:

means for producing from each said electrical pulse an identical corresponding respective pulse;

means for shifting the phase of said corresponding pulse with respect to said electrical pulse by a predetermined time;

means for inverting and amplifying said phase shifted corresponding pulse;

means for combining said electrical pulse with said corre-

sponding amplified, inverted and phase shifted respective pulse to form a combined pulse;

timer actuating means operative at said reference time;

a timer responsive to said actuating means and to a predetermined characteristic of said combined pulse for producing a first signal having a characteristic with a magnitude related to the time of occurrence of said combined pulse characteristic measured from said reference time;

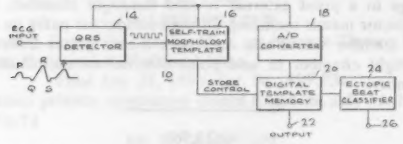
means for producing a second signal having a characteristic with a magnitude related to said predetermined phase shift time; and

means for combining said first and second signals to form a third signal having a characteristic with a magnitude related to the difference in magnitudes of said respective characteristics of said first and second signals, said third signal characteristic magnitude being related to said onset time.

4,023,564
ARRHYTHMIA DETECTOR

Donley J. Valiquette, Camarillo, and Tom A. Finger, Tustin, both of Calif., assignors to Spacelabs, Inc., Chatsworth, Calif.

Filed Jan. 26, 1976, Ser. No. 652,622
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 A **6 Claims**



1. A circuit for detecting heart arrhythmias in response to a signal representing the functioning of the heart comprising:

means for storing a plurality of reference values comprising a reference template;

means responsive to the signal representing the functioning of the heart for periodically sampling the signal to provide a plurality of sample values;

means for comparing the sample values with the reference values to provide an alarm signal whenever a difference occurs;

means for averaging the sample values with the reference values to update the reference values; and

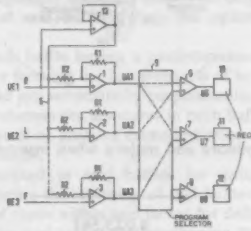
means responsive to each alarm signal for storing representations of the sample values, and means responsive to each alarm signal for comparing the sample values with the stored representations and operative to provide a second alarm signal whenever the sample values are equal to the stored representations.

4,023,565
CIRCUIT ARRANGEMENT FOR THE PROCESSING OF PHYSIOLOGICAL MEASURING SIGNALS

Thomas Ohlsson, Vallingby, Sweden, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 19, 1975, Ser. No. 588,467
Claims priority, application Germany, June 21, 1974, 2429953
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 B **5 Claims**

1. In a circuit arrangement for the processing of physiological measuring signals, including a plurality of input amplifiers each having respectively a positive input and a negative input; a signal reproducing installation; and a take-off electrode connected to each amplifier, said take-off electrodes for said signals being connected to the positive inputs of said input amplifiers; first resistors being connected between said negative inputs and the outputs of said input amplifiers; second resistors connected between said negative inputs and a potential junction common to all input amplifiers; and a differential amplifier having two inputs connected to the outputs of each two of said input amplifiers, the output of said differential amplifier being connected to said signal reproducing installation, said differential amplifier providing an output signal for

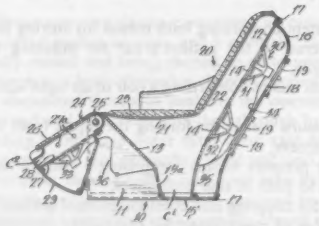


controlling said signal reproducing installation, a program selector connected between the outputs of said input amplifiers and the inputs of the differential amplifier for connecting pre-programmed output pairs of the input amplifiers to said differential amplifier, said common potential junction being connected to a take-off electrode free of ground potential.

4,023,566
BODY-SUPPORTING MEANS WITH ADJUSTABLE VIBRATORY MEANS IN THE AUDIBLE FREQUENCY RANGE

Werner W. Martinmaas, 2340 Skyline Blvd., Reno, Nev. 59501

Filed Oct. 10, 1975, Ser. No. 621,358
Int. Cl.² A61H 1/00
U.S. Cl. 128—33 **12 Claims**



1. A device for supporting the body of a person comprising, in combination:

a base structure comprising a plurality of connected walls which define a housing that is upwardly open;

effectively uninterrupted rigid body-supporting means comprising a sheet of material which forms the top of said housing and has its periphery secured to said plurality of connected walls to define a chamber which, at least when the device is on a supporting surface, is enclosed but for pressure relief openings of minimal area and a loud speaker opening in one of said plurality of connected walls;

a loudspeaker mounted in immediate confronting proximity to said loudspeaker opening and facing the body-supporting means, there being means for operatively connecting said loudspeaker to means including an electronic amplifier so that it may produce vibrations of the air within the chamber which are in the audible frequency range, whereby an occupant of the device receives said vibrations through the rigid body-supporting means, said amplifier being provided with means for varying the intensity of said vibrations;

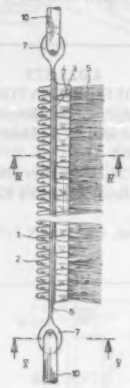
and means enclosing the rear of said loudspeaker.

4,023,567

MASSAGE BELT

Hans Wessel, D-5226 Reichshof 31, Wildbergerhutte, Germany

Filed Mar. 31, 1976, Ser. No. 672,332
Claims priority, application Germany, June 10, 1975, 7518547[U]
Int. Cl.² A61H 7/00
U.S. Cl. 128—63 7 Claims



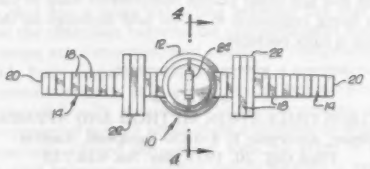
1. A massage belt comprising a first side having nipples extending thereover, a second side having brush bristles extending thereover, said first side and said second side being joined back to back with said nipples and said brush bristles extending on opposite sides of said belt, thickened end portions located on opposite ends of said belt and defining at said opposite ends a pair of ducts extending across the entire width of said belt, rope handle extending through each of said ducts for enabling manipulation of said massage belt and a rigid sleeve member lining each of said ducts at each of said opposite ends of said belt to reinforce said thickened end portions and to impart rigidity thereto.

4,023,568

CAST POSITIONING DEVICE

Jack Murphy, 25361 Yale St., Hemet, Calif. 92343

Filed Feb. 9, 1976, Ser. No. 656,438
Int. Cl.² A61F 5/04
U.S. Cl. 128—83 2 Claims



1. A cast positioning device for embedding in a cast applied to a person's limb, comprising:

a substantially rigid and planar center portion having an eye member extending upwardly therefrom;

substantially planar and rigid strap members connected to and in the same plane as said center portion for securing said center portion to a cast by embedding the same in a cast; and

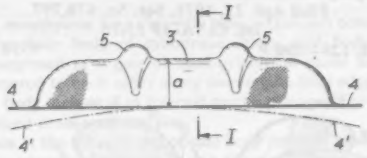
integral anchor members extending laterally from said strap members adjacent said center portion.

4,023,569

DEVICE FOR THE PROTECTION OF WOUNDS

Herbert Warnecke, and Adolf Lindner, both of Vienna, Austria, assignors to Tuwa-Plastik Dr. Herbert Warnecke Erzeugung von Kunststoffartikeln Gesellschaft m.b.H., Vienna, Austria

Filed Sept. 18, 1975, Ser. No. 614,672
Claims priority, application Austria, Dec. 5, 1974, 9762/74
Int. Cl.² A61F 13/00
U.S. Cl. 128—154 13 Claims



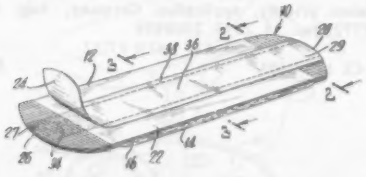
1. A device for the protection of wounds comprising a shallow perforated bowl of substantially semicircular cross-section terminating at its edges in substantially flat rim portions and constructed of thermoplastic material selected from the group consisting of polyethylene, polypropylene and high pressure polypropylene of such stiffness that deflection thereof by a load of 1 kg applied from the convex side to the bowl throughout its bottom surface is less than the height of the bowl measured from its bottom surface to a plane defined by the rim portions, the shape of said bowl being in the form of an elongated depression havng a length more than three times its width, said bowl being gridlike and formed with apertures separated by crossing bars, the dimensions of the cross-section of the bars taken in the direction of the surface of the bowl and at right angles to that direction being from about 1:1 to 1:1.5 to each other and the area of the apertures exceeding the grid formed by the crossing bars.

4,023,570

ADHESIVELY ATTACHED ABSORBENT LINERS

Kays Chinai, Burlington, and James A. Ginocchio, Summit, both of N.J., assignors to Personal Products Company, Milltown, N.J.

Filed Apr. 21, 1976, Ser. No. 678,796
Int. Cl.² A61F 13/16
U.S. Cl. 128—290 R 7 Claims



1. A protective absorbent liner for nether garments comprising:

an elongated absorbent body having a body contacting major surface and a garment contacting major surface;

means for securing said liner to the interior of the crotch portion of said nether garment, said means comprising a pressure sensitive adhesive element disposed upon said garment contacting surface and extending longitudinally and substantially, from end to end on said garment contacting surface;

a removable protective release strip overlying said pressure sensitive adhesive element;

at least one end portion of said pressure sensitive adhesive elements being provided with a pattern of raised and depressed areas whereby the resistance to peeling of both the the release strip and the nether garment is lower in said end portion than in the central portion of said adhesive element.

4,023,571

NON-PLANAR ARCUATE SHAPED ABSORBENT LINER

John M. Comerford, Morganville, and Mohamed W. Hammad, Old Bridge, both of N.J., assignors to Personal Products Company, Milltown, N.J.

Filed Apr. 21, 1976, Ser. No. 678,797

Int. Cl.² A61F 13/16

U.S. Cl. 128—290 P 10 Claims

1. An absorbent nether garment liner comprising:

an absorbent layer having a first and second major surface, said absorbent layer exhibiting an elongation under tensile stress which is recoverable when said stress is relaxed;

a body fluid impervious layer overlying and adhered to said first major surface, said body fluid impervious layer exhibiting less recoverable elongation than said absorbent layer;

said absorbent nether garment liner being essentially planar and flat under tension and assuming a non-planar arcuate shape, concave inward toward said second maor major when said tension is relaxed.

4,023,572

MILLING TOOL FOR PREPARING A JOINT SOCKET IN THE PROSTHETIC REPLACEMENT OF A JOINT

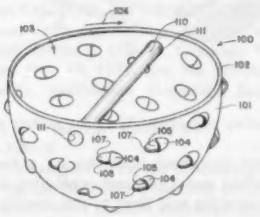
Hanfried Weigand, Sudring 106, 65 Mainz-Bretzenheim; Bernhard Bellmann, Moselstr. 7, 6102 Pfungstadt; Henning Muller-Gerbes, Pfungstadter Str. 35, 61 Darmstadt-Eberstadt; Wolfhard Sack, Berliner Str. 1, 6081 Wolfskehlen, and Paul-Heinz Theimert, Gerhart-Hauptmann-Str. 10, 6101 Weiterstadt, all of Germany

Filed Aug. 5, 1975, Ser. No. 602,061

Claims priority, application Germany, Aug. 6, 1974, 2437772; Jan. 11, 1975, 2500959

Int. Cl.² A61B 17/32

U.S. Cl. 128—305 54 Claims



1. A milling tool for use in milling tissues from a joint socket in the prosthetic replacement of a joint, comprising:

a. a hollow body having a substantially hemispherical outer surface and defining an internal cavity, the body having a rim which extends around an open end of the cavity;

b. a plurality of blades carried in spaced relationship on the outer surface of the body;

c. opening means including a plurality of openings formed through the outer surface and communicating with the cavity, at least a separate one of the openings being associated with each of the blades and being operable to channel tissue materials which have been cut off by the blades into the cavity; and

d. tool support means drivingly connected to the body for positioning and rotating the body, the support means including a cover which releasably closes the open end of the cavity.

4,023,573

DEFIBRILLATOR

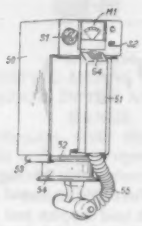
James Francis Pantridge, Colin House, Dunmurry, Co. Antrim, and John Anderson, 38 Ardmore Road, Holywood, Co. Down, both of Ireland

Filed Oct. 28, 1975, Ser. No. 626,177

Claims priority, application United Kingdom, Oct. 28, 1974, 46464/74

Int. Cl.² A61N 1/36

U.S. Cl. 128—419 D 6 Claims



1. A defibrillator apparatus comprising a capacitor, charging means including a direct current source arranged to charge the capacitor to a given energy level, an inductance and a pair of electrodes arranged to be connected by switch means to said capacitor, one by way of said inductance, whereby the capacitor may be discharged through a patient by means of the electrodes to inflict an electric shock on that patient, the selection of the energy level, the capacitor and the inductance being such that the voltage wave-form across the electrodes of the discharge pulse has a predetermined duration, peak value and rise time when the electrodes are connected across a load resistance which corresponds to that of a typical patient, each of said electrodes being mounted as at least a portion of a respective housing which may be placed in contact with the patient, and the charging means, inductance, capacitor and any other circuit components used in the defibrillator being contained in or on said housings so that the apparatus is fully portable.

4,023,574

ELECTROSTIMULATION METHOD AND APPARATUS

Hans Nemec, Austrasse 1, A-6830 Rankweil, Austria

Filed Oct. 20, 1975, Ser. No. 624,773

Claims priority, application Austria, Oct. 18, 1974, 8407/74

Int. Cl.² A61N 1/36

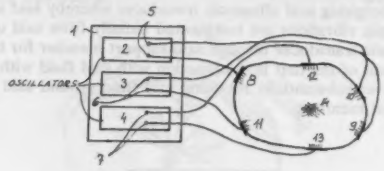
U.S. Cl. 128—420 A 4 Claims

1. A method of treating a human or animal body comprising the steps of:

passing between two separate primary locations through a given portion of said body a primary alternating electrical current having a primary frequency of between 1000 Hz and 100,000 Hz;

passing between two secondary locations spaced on said

body from said primary locations a second alternating electrical current through said portion, said secondary current having a secondary frequency differing from said primary frequency by at most 100Hz, whereby said primary current and said secondary current may beat together at a beat frequency; and



passing between two separate tertiary locations spaced on said body from said primary and secondary locations and through said portion a tertiary alternating current having a tertiary frequency differing from one of said primary, secondary and beat frequencies by at most 1 Hz.

4,023,575

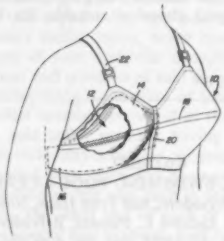
CONTOUR BUSTETTE

Letha R. Nixon, P.O. Box 315, Denver City, Tex. 79323

Filed Mar. 2, 1976, Ser. No. 663,045

Int. Cl.² A41C *3/10*

U.S. Cl. 128—481 **5 Claims**



1. In combination with a brassiere, a breast prosthesis adapted to be positioned on the body of a mastectomy patient inside one of te cups and underarm side portions of the brassiere that has a seam extending between the side portions across the centerline between the cup portions to which shoulder straps are connected; said prosthesis comprising a single flexible body-contacting panel forming a continuous surface of convex curvature, at least two flexible brassiere-contacting panels peripherally secured to the body-contacing panel and interconnected to each other along a continuous edge portion substantially aligned throughout with the seam of the brassiere, said brassiere-contacting panels forming a breast contour surface of convex curvature and an underarm section extending from the centerline in contact with substantially the entire cup and underarm side portion of the brassiere, closure means releasably connecting the brassiere-contacting panels to the body-contacting panel at an end remote from the underaram section in substantial alignment with said centerline of the brassiere to enclose a cavity, and a mass of filler material retained in said cavity by the closure means to maintain said convex curvatures of the surfaces formed by the panels.

4,023,576

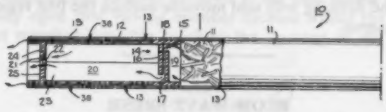
CIGARETTE MOUTHPIECE FOR CONTROLLING FLOW

Vello Norman, Raleigh, N.C., assignor to Liggett & Myers Incorporated, Durham, N.C.

Continuation-in-part of Ser. No. 417,800, Nov. 21, 1973, abandoned. This application July 11, 1975, Ser. No. 594,978

Int. Cl.² A24F *7/04*

U.S. Cl. 131—10 A **10 Claims**



1. A mouthpiece for a cigarette tobacco column comprising

a one-piece body of cylindrical shape, said body being comprised of a pair of semi-cylindrical shells hingedly secured to each other along one longitudinal edge,

said body including an internal smoke passage of predetermined cross-sectional size,

means at the tobacco end of said body defining a barrier to the passage of tabacco from a tobacco column into said smoke passage,

means defining an orifice at an opposite end of said body having a predetermined size less than said size of said smoke passage to meter the amount of smoke flowing out of said smoke passage for a given draw and to thereby deliver smoke at a higher velocity,

said orifice defining means including a pair of abutting walls transverse to the longitudinal axis of said body, each of said walls having a slot therein disposed in overlapping relation to define said orifice, and

means on an external surface of said body defining a plurality of flow paths for ventilation air, said flow path defining means comprising a plurality of grooves on the external surface extending to said orifice end of said body.

4,023,577

MANUFACTURE OF CIGARETTES

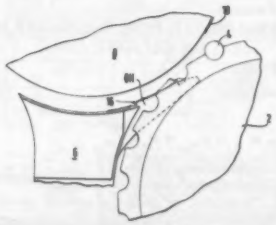
Edward George Preston, and Jan Antoni Rakowicz, both of London, England, assignors to Molins Limited, Great Britain

Filed Feb. 3, 1975, Ser. No. 546,674

Claims priority, application United Kingdom, Feb. 5, 1974, 5366/74

Int. Cl.² A24C *5/52*

U.S. Cl. 131—94 **20 Claims**



10. Apparatus for causing rod-like articles such as cigarettes to roll along a predetermined path, comprising a pair of spaced opposed surfaces, a channel having a width defined by said opposed surfaces through which channel rod-like articles may be moved transversely, one of said surfaces being formed on a movable member and the other surface being fixed whereby a rod-like article may be caused to roll relative to said surfaces through said channel, and means for delivering rod-like articles into said channel at an end of the channel,

said channel including a first region adjacent said end and a second region downstream of said first region with respect to said end, the width of the channel in the first region being less than that in the second region, wherein the first and second regions of the channel are defined by different levels of the fixed surface, and wherein the fixed surface comprises a main part defining with said movable surface the second region of the channel and a plurality of fingers extending from the main part and defining with said movable surface the first region of the channel.

4,023,578

BLOW-WAVE BRUSH

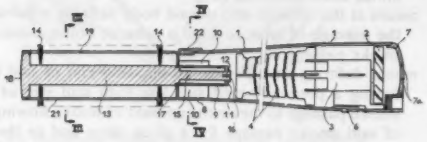
Harald Buhler, Ponchon, France, assignor to Etablissements Lardenois, Hermes, France

Continuation of Ser. No. 550,972, Feb. 19, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 682,757

Claims priority, application France, Nov. 8, 1974, 74.37119

Int. Cl.² A45D *2/36*

U.S. Cl. 132—9 **10 Claims**



1. An apparatus for drying and styling the hair comprising:

an elongated cylindrical brush having tufts mounted around a central support;

a cylindrical heat-conducting cage surrounding and spaced from said support, the tufts of said brush passing through said cage and projecting beyond the outer surface thereof, and

means for blowing hot air into said cage in a stream which is substantially uniform around the periphery of said central support;

said cage being provided with a plurality of openings therethrough, said openings being so distributed that said hot air escapes from said cage in a radial stream which is substantially uniform around the circumference of said cage, whereby said cage is substantially uniformly heated around its entire periphery.

4,023,579

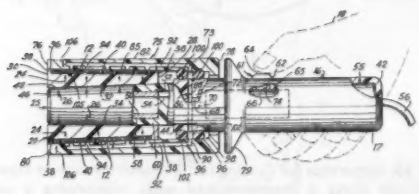
ULTRASONIC TREATMENT OF HAIR

Leonard W. Suroff, Jericho, N.Y., assignor to Xygiene, Inc., Panama, Panama

Filed May 17, 1976, Ser. No. 687,331

Int. Cl.² A45P *1/04*

U.S. Cl. 132—9 **65 Claims**



1. The method of treating hair on the human head, comprising the steps of:

A. providing a cylindrical shaped support member capable of transmitting ultrasonic vibrations in a radial mode,

B. placing hair around said support member to receive vibrations transmitted by said support member,

C. disposing a cover substantially around said support member,

D. positioning an ultrasonic transducer adapted to produce radially directed vibrations within said support member in energy coupling relation thereto,

E. supplying a treatment fluid to the hairs supported on said support member, and

F. energizing said ultrasonic transducer whereby said ultrasonic vibrations are transmitted radially from said ultrasonic transducer through said support member for treatment of the hair in conjunction with said fluid with said cover substantially retaining said fluid around said support member.

4,023,580

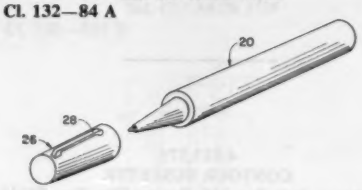
PLAQUE MARKER TOOTHBRUSH KIT

Eli Pieters, Brooklyn, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 14, 1976, Ser. No. 677,015

Int. Cl.² A45D *44/18*

U.S. Cl. 132—84 A **4 Claims**



1. A toothbrush kit comprising a head containing bristles which fits onto a body comprising a plaque marker provided with a felt dispensing tip and a cover for the head, the cover provided with a clip; the marker being adapted for use with and containing a liquid chemical suitable for highlighting plaque.

4,023,581

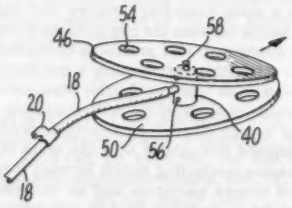
AUTOMATIC SWIMMING POOL CLEANER

Andrew L. Pansini, Belvedere, and Fritz Haas, Novato, both of Calif., assignors to Andrew L. Pansini, Belvedere, Calif.

Filed Nov. 10, 1975, Ser. No. 630,206

Int. Cl.² B63H *11/02*; B08B *3/02*

U.S. Cl. 134—167 R **11 Claims**



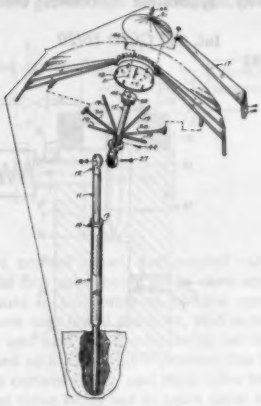
1. A swimming pool cleaner comprising a hub member having opposed non-parallel planar faces, a pair of discs, one having its center portion swivel-connected to one of said faces and the other having its center portion swivel-connected to the other of said faces, said planar faces being located substantially within imaginary intersection planes within which said discs are also substantially located.

4,023,582

VENTED METAL UMBRELLA KIT

Robert W. Buzzella, and Howard O. Biggers, both of 630 W. 84th St., Miami, Fla. 33014

Filed Apr. 5, 1976, Ser. No. 673,382
Int. Cl.² A45B 11/00
U.S. Cl. 135—20 R 6 Claims



1. An umbrella comprising, in combination, a vertical support structure, a support arm adjustably secured at one end to the upper end of said vertical support structure, an umbrella disc secured to the other end of said support arm, a pair of umbrella canopy half-sections, each substantially in the shape of a half sector of a circle having its apex end truncated along an arc concentric with its origin, means securing said umbrella half-sections in side-by-side depending relation about said support disc with their apex ends secured to said support disc, a cone member of greater diameter than said support disc secured over said support disc and inner end portions of said umbrella canopy half-sections, brace mechanism supporting inside portions of said umbrella canopy half-sections with respect to lower end portions of said support arm, said brace mechanism comprising a plurality of tubular radial arms, a cylindrical collar member provided at the lower end of said support arm, said collar member having in its upper end a plurality of peripherally-arranged arcuate recesses, one for each of said radial arms, each arm having at one end a down-turned end portion seated one each in said arcuate recesses, means securing the other end of each of said radial arms to radial mid-portions of said umbrella half canopy half-sections, said brace mechanism further comprising tubular members fixed against the underside of each said umbrella canopy half-sections in concentric relation thereto, and T-connector fittings secured to said arcuate tubular members and having sockets seating the other ends of said radial arms, and means securing said down-turned end portions of said radial arms to said support arm, said support arms securing means comprising a plurality of screw-threaded openings in said support arm and bolts extending through diametrical openings in said down-turned end portions and received one each in said threaded openings.

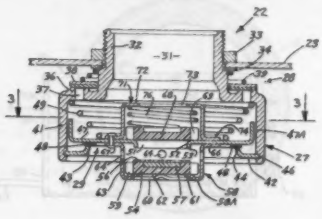
4,023,583

VENT VALVE WITH BACK PRESSURE CHECK

Lindley A. Parkinson, Anoka, Minn., assignor to Brown-Minneapolis Tank & Fabricating Co., Minneapolis, Minn.

Filed Nov. 10, 1975, Ser. No. 630,199
Int. Cl.² F16K 17/36
U.S. Cl. 137—39 26 Claims

21. Valve apparatus for controlling the flow of fluids, as liquids and gases into and out of an enclosed chamber, said chamber being provided by a container means for accommodating the fluids comprising: a body having a passage open to the chamber and the environment outside the chamber, seat means cooperating with the body surrounding said passage, a valve assembly cooperating with the seat means for controlling the flow of fluid through said passage, means for biasing the valve assembly into engagement with the seat means, said valve assembly having a base means having an opening between the passage and the chamber, first valve means having a cup-shaped cage member fastened to the base means and a normally open first valving member located within the cup-shaped member operable to close the opening in the base



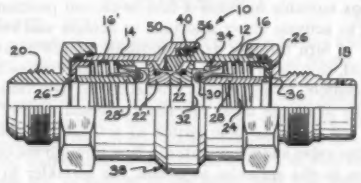
means, and second valve means having an inverted cup-shaped cage member fastened to the base means and located in general longitudinal alignment with the cup-shaped member of the first valve means and a normally closed second valving member located within the second inverted cup-shaped member operable to close the opening, and means to bias the second valving member to the closed position in engagement with the base means, each of said cup-shaped members having transverse walls with central openings to facilitate the flow of gas and liquid through said cup-shaped members.

4,023,584

FRANGIBLE VALVED FITTING

Russell L. Rogers, Munith, and Richard A. Buseth, Jackson, both of Mich., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Sept. 5, 1975, Ser. No. 610,625
Int. Cl.² F16K 17/40
U.S. Cl. 137—68 R 14 Claims



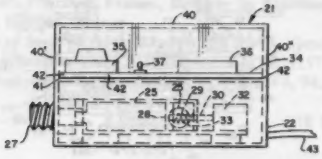
1. A frangible valved fluid coupling comprising, in combination, a tubular body having an axis, an exterior surface, an inlet end, an outlet end and defining a fluid passage, an elongated, frangible radially extending rib defined on said body extending from said exterior surface about the circumference thereof and located adjacent one of said ends, a valve within said passage, a connecting member located adjacent said one end affixed to said body having an extending portion superimposed over said rib, and a retainer mounted in said extending portion engaging said rib on the opposite side thereof with respect to said one end maintaining said connecting member upon said body, said retainer causing said rib to fracture upon the existence of a predetermined axial force tending to separate said member and body.

4,023,585

WATERING DEVICE

Arlow L. VandenBurg, 312 N. 14th St., Bismarck, N. Dak. 58501

Filed Feb. 17, 1976, Ser. No. 658,740
Int. Cl.² B05B 12/12, 12/02
U.S. Cl. 137—80 1 Claim



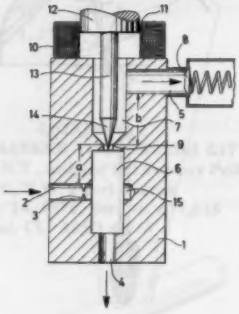
1. An automatic garden and lawn watering device for watering gardens and the like comprising a rectangular box having a conduit member therein, said box having an inlet bore adjacent one end of said conduit, with an inlet bore connection mounted to said one end of said conduit adjacent said bore in said box, said inlet hose connection being for attachment to a source of water through a hose connection, said box having an outlet bore with an outlet hose connection mounted to said other end of said connection, said outlet hose connection being for attachement to a sprinkler through another hose connection, a valve in said conduit, a solenoid mounted within the box having a coil and a plunger with a rod connected to said plunger to said valve whereby actuation of said solenoid moves said plunger to move said valve to open said conduit spring return means to return said plunger to close said conduit and deactuation of said solenoid allows said spring means to move said plunger to close said conduit, a timer mounted to said box having a timer switch to activate said solenoid in said box, a thermostat mounted on said box having a thermostatic switch on said box to activate said solenoid, a first switch on said box movable to either a first or second position respectively, to activate either said time or actuate said thermostat which in turn through its thermostatic switch actuates said solenoid, said timer, when activated by said first switch in its first position, having means connected to said timer switch whereby when the timer reaches a selected time of day the timer will close the time switch to activate the solenoid to open the valve and allow water to flow through the conduit in the box to the sprinkler to enable the sprinkler to sprinkle gardens and the like and the timer will keep the time switch closed for a selected amount of time, so that the water can continue to flow through the conduit to the sprinkler to sprinkle for a selected amount of time, said first switch being movable to a second position to deactivate said timer and actuate said thermostat, said thermostat having means when activated whereby the thermostat may be set near the first level and when the temperature nears frost level, the thermostat will automatically close the thermostatic switch to activate the solenoid to open the passageway, so that water may flow through the conduit in said box to the sprinkler to sprinkle gardens and the like for so long as the temperature is near the frost level or below, with the sprinkling of the water on the producer's gardens acting to prevent damage to produce in the garden.

4,023,586

ELECTRICAL CONTROL FOR HYDRAULICALLY-ACTUATED, MULTIPATH VALVES

Lothar Nemetz, Bad Oeynhausen, and Klaus Nusse, Leopoldshohe, both of Germany, assignors to Eisenwerk Weserhutte AG, Germany

Filed Aug. 12, 1975, Ser. No. 604,060
Claims priority, application Germany, Dec. 20, 1974, 2460404
Int. Cl.² G05D 16/20
U.S. Cl. 137—82 1 Claim



1. An electrically-controlled, hydraulically-actuated, three-way, pressure-regulating valve comprising a housing,
pressure regulating chamber means in said housing,
main inlet means and main outlet means connected to said chamber means, said inlet means having a flow restricting viscosity non-influenced orifice means therein adapted to form a jet of introduced fluid,
blind hole means in said housing directly opposite the discharge end of said inlet means and coaxial therewith, whereby jet stream impulses are eliminated,
second chamber means in said housing coaxial with said pressure regulating chamber means,
valve seat means at a juncture of the two chamber means,
slidable valve means coaxially passing through said second chamber means and having one end tapered to seat in said valve seat mean.,
magnetizable core means mounted on the other end of said valve means,
electrical coil means mounted adjacent said core means,
by-pass passage means connected to said second chamber means,
pre-loaded valve means in said by-pass passage means,
and said main inlet means and said by-pass passage means being positioned at a distance from said valve seat means.

4,023,587

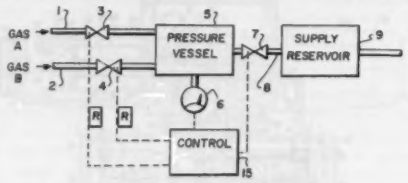
METHOD AND APPARATUS FOR MIXING TWO GASES IN A PREDETERMINED PROPORTION

Günther Dobritz, Lubeck, Germany, assignor to Dragerwerk Aktiengesellschaft, Lubeck, Germany

Division of Ser. No. 631,889, Nov. 14, 1975. This application May 13, 1976, Ser. No. 686,658
Int. Cl.² G05D 11/00
U.S. Cl. 137—88 4 Claims

1. An apparatus for mixing two gases in a predetermined proportion, comprising a pressure control vessel, a first line for supplying a first gas connected to said pressure control vessel, a first gas control valve in said first connecting line, a second connecting line for the supply of a second gas connected to said pressure control vessel, a second gas control valve in said connecting line, a mixed gas line for delivering the mixed gas connected to said pressure control vessel, a third gas control valve in said mixed gas line, each of said first,

second and third control valves being set for opening and closing at separate distinct pressures, and control means connected to said pressure vessel and to each of said first, second and third valves to open and close said valves in accordance with the set values of pressure for opening and closing, said valves being set so that an initial pressure in said pressure control vessel causes the opening of said first valve to permit inflow of a first gas through said first gas connecting line to



said pressure control vessel, said second valve being set to open and said first valve being set to close upon the increase of the pressure in said pressure control vessel to a higher pressure above said initial pressure, said second valve being set to close and said third valve being set to open when a predetermined additional higher pressure has been reached in said pressure control vessel, said third valve being set to close and said first valve being set to open once again when said initial pressure returns to said pressure control vessel.

4,023,588

CONTROL DEVICE FOR MILKING MACHINES

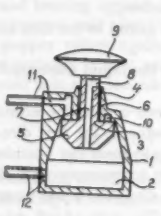
Karl Erik Olander, Sodertalje, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Filed Sept. 2, 1975, Ser. No. 609,902

Claims priority, application Sweden, Sept. 11, 1974, 7411451

Int. Cl.² A01J 5/10

U.S. Cl. 137—103 **8 Claims**



1. In combination with a conduit communicating alternately with a vacuum source and a pressure source, a control device comprising a housing forming a chamber into which said conduit has an opening, there being a separate connection between the chamber and the pressure source which is independent of said conduit, a valve member located in said chamber and operable from outside the chamber, the valve member having a first position in which it blocks said opening of the conduit into the chamber while uncovering said separate connection so that, when vacuum prevails in the conduit, the valve member is sucked against said opening and thus maintained in said first position, the valve member being movable automatically to a second position in response to the conduit communicating with the pressure source, the valve member in said second position uncovering said opening of the conduit into the chamber while blocking said separate connection.

4,023,589

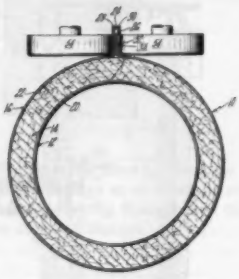
TUBULAR JOINT AND THE PRODUCT FORMED THEREBY

William E. Rejeski, Farmington, Conn., assignor to The Wiremold Company, West Hartford, Conn.

Filed Oct. 15, 1974, Ser. No. 515,055

Int. Cl.² F16L 9/14

U.S. Cl. 138—149 **3 Claims**



1. An elongated flexible tubular member of indeterminate length comprising a flexible sheet of material curved to close on itself to provide a tubular member with opposite edges having longitudinally extending radially outwardly projecting interior surfaces in adjacent relation, an elongated tape folded lengthwise to provide a fold having a bend directed away from the center of the tubular member and free edges directed toward its center, the tape having exterior surfaces respectively confronting said interior surfaces of the tubular member, and means to adhere said interior surfaces of the tubular member with confronting exterior surfaces of the tape to form a tubualr member having a taped joint without the interior surfaces of the tape adhering to itself such that when tension is applied across the taped joint the tape will unfold and lie substantially flat inside the tubular member with its opposite edges overlapping the tape.

4,023,590

MANHOLE CONSTRUCTION

James R. Harris, Portland, and Allen B. Kalkhoven, Beaverton, both of Oreg., assignors to The Oregon Drop Corporation, Portland, Oreg.

Continuation-in-part of Ser. No. 537,207, Dec. 30, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 623,720

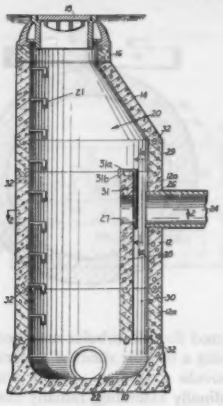
Int. Cl.² E02D 29/12

U.S. Cl. 137—363 **2 Claims**

1. In a manhole construction of the type having a base with an outlet, and upper frame and a cover on said frame, an open ended tubular body section arranged to be supported on the base for supporting the frame, said body section comprising at least one precast unit having an open center and having an inlet opening arranged for communication with a service line, a vertical wall extending across the interior of said body section from top to bottom of the latter, said wall being offset from the center of said body section and extending crosswise in front of said inlet opening in spaced relation thereto for forming an upright passageway in said body section directing incoming fluid from said inlet opening to the outlet, said passageway being open at the top for cleaning access of the passageway by a workman, and means in said vertical wall defining an opening substantially axially aligned with said inlet opening for cleaning the latter, and removable cover means for said opening.

2. In a manhole construction of the type having a base with an outlet, an upper frame and a cover on said frame, at least two open ended, round tubular body sections arranged to be supported one upon the other on the base for supporting the frame, said body sections comprising precast units having an open center and having top and bottom edges, an upper one of

said body sections having an inlet opening arranged for communication with a service line, a vertical wall extending across the interior of said body sections from top to bottom of the latter and having top and bottom edges in the plane of the top and bottom edges of its body section, said wall being offset from the center of said body sections to form an upright passageway in said body sections, said wall in said one body



section which has the inlet opening extending crosswise in front of said inlet opening to direct incoming liquid down through said passageway, and interfitting means formed in the top and bottom edges of said body sections and said walls whereby said body sections in seated engagement one upon another will be disposed with the upright passageways therein in vertical alignment.

4,023,591

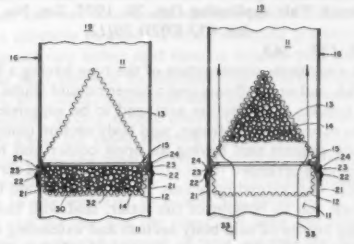
VALVE OF PARTICULATED MATERIAL FOR VERTICAL FORCED AIR CHANNEL

Don L. Short, and Steven L. Short, both of 312 S. Columbia Center Blvd., Kennewick, Wash. 99336

Filed Nov. 14, 1975, Ser. No. 631,867

Int. Cl.² F16K *15/00*

U.S. Cl. 137—533 **6 Claims**



1. In a substantially vertically oriented, normally closedly biased, air openable valve, the combination comprising:

a single permeable structure designated as a body, having a smaller lower part forming a valved channel and a larger upper part of conic-like shape, peripherally defining a single channel therethrough; and

a unitary, non-singulated mass of sealing particles not greater than the volume of the lower part of the permeable body, said particles having physical properties such as to allow the mass of sealing particles to move into the larger upper part of the body responsive to upward air-flow to allow such air-flow through the body.

4,023,592

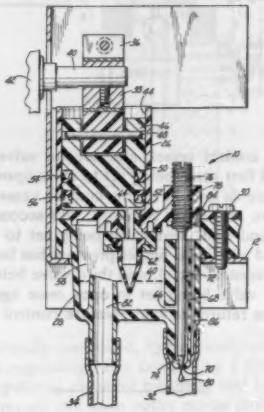
PUMP AND METERING DEVICE

Robert C. Patzke, Prospect Heights; Thomas V. DeRyke, Libertyville; Stephen Ernohazy, and Eugene P. Oddo, both of Mount Prospect, all of Ill., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Mar. 17, 1976, Ser. No. 667,865

Int. Cl.² F17D *1/13;* **B67D** *3/00;* **F04B** *19/04, 23/02*

U.S. Cl. 137—565 **8 Claims**



1. A pump and metering apparatus for supplying a controlled amount of a volatile liquid from a liquid supply source to a utilization device, comprising:

a chamber for receiving volatile liquid from a liquid supply source;

a piston within the chamber movable in a first direction for drawing liquid from the liquid supply source to the chamber and movable in a second direction for dispensing liquid from the chamber;

means for moving the piston in the first and second directions;

a reservoir for storing the liquid dispensed from the chamber;

means operable between a closed position in response to movement of the piston in the first direction to prevent dispensement of liquid from the chamber, and an open position in response to movement of the piston in the second direction to dispense liquid from the chamber to the reservoir;

metering means for controlling the rate of flow of liquid from the reservoir to the utilization device;

a tube extending from the reservoir to the utilization device having one end thereof attached to the metering means for receiving drops of liquid dispensed therefrom, the other end of the tube attached to inlet means of the utilizaton device and a formed portion intermediate the said ends of the tube for storing a quantity of volatile liquid in which the volatile liquid exists as both liquid and gas, said one end of the tube positioned above the level of the other end of the tube to maintain the amount of liquid flow to the utilization device equal to the amount of liquid flow from the reservoir;

a first vent means to equilibrate the atmosphere in the tube by allowing the gas to re-enter the reservoir; and

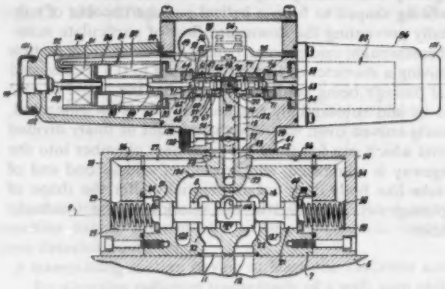
a second vent means to equilibrate the reservoir to the atmosphere to prevent impediment to liquid flow.

4,023,593

VALVE AND CONTROL THEREFOR

Jack E. Piccardo, Oakland, Calif., assignor to The Rucker Company, Oakland, Calif.

Filed Feb. 17, 1976, Ser. No. 658,295
Int. Cl.² F15B 13/043
U.S. Cl. 137—625.64 5 Claims



1. A valve and control therefor comprising a main valve body having a main bore therein and having therein pressure, tank and cylinder passages merging with said main bore; a main valve spool reciprocable in said main bore and having lands and grooves variously to interconnect and isolate said passages; means at one end of said main valve body defining a first chamber in which one end of said main valve spool is exposed; means at the other end of said valve body defining a second chamber in which the other end of said main valve spool is exposed; centering springs in said chambers bearing against said ends of said main valve spool; a pilot valve body having a pilot bore therein; a first capsule having a flow passage with a first valve seat therein disposed in one end of said pilot bore; a first poppet valve in said first capsule and movable to and from said first valve seat; means defining a bore in said first capsule extending around said first valve seat; a second capsule having a flow passage with a second valve seat therein disposed in the other end of said pilot bore; a second poppet valve in said capsule and movable to and from said second valve seat; means defining a bore in said second capsule extending around said second valve seat; a pilot spring in said pilot bore and bearing against said first and said second poppet valves; means on said pilot valve body for individually operating said poppet valves against said pilot spring; and means including passages in said pressure and said tank passages and with said first and second chambers.

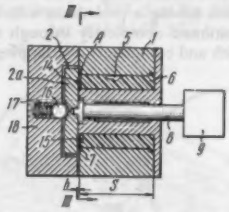
4,023,594

THROTTLE

Arnold Yakovlevich Kats, ulitsa Korolenko, 17, kv. 22; Georgy Pavlovich Dubosarsky, Chernomorskaya doroga, 19, kv. 5; Dmitry Pavlovich Zakhvatkin, ulitsa Kosmonavtov, 20, kv. 57; Iosif Kharitonovich Burda, ulitsa Tereshkovoi, 20v, kv. 28; Sergei Afanasievich Mezentsev, Primorsky bulvar, 2, kv. 4; Natan Mironovich Barshtak, ulitsa Belinskogo, 8, kv. 4, and Jury Vladimirovich Chernykh, ulitsa Chernyakhovskogo, 13, kv. 17, all of Odessa, U.S.S.R.

Filed Aug. 6, 1975, Ser. No. 602,441
Int. Cl.² F15D 7/10
U.S. Cl. 138—43 18 Claims

1. A throttle for use in hydraulic apparatus adapted to control or stabilize the liquid flow rate through the throttle in response to liquid temperature variation and to provide for laminar flow of said liquid comprising: a housing having slot means and including a rotor mounted about the axis of said housing, and being adapted to rotate about same; at least one insert having a height, fixedly secured to said slot means in said housing, and being in juxtaposition with said rotor along at least a portion of a wall face; a throttle passage having a predetermined depth for liquid to pass formed between said insert and said rotor; an inlet hole and an outlet hole in said housing communicating with said throttle passage, and said insert being made of a material having an expansion factor higher than that of said housing; whereby any liquid temperature variation will change the dimensions of the insert thereby affecting said throttle passage so as to adjust and control the flow rate of said liquid flowing through said throttle passage and minimize any clogging thereof.

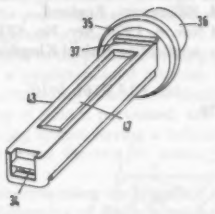


4,023,595

FLOWRATE CONTROL DEVICE

Aba Zakay, Galil Elion, Israel, assignor to Mifal Leyitzur Mamtirim Veavizarei Hashkaya Bekibbutz Dan, Kibbutz Dan, Israel

Continuation-in-part of Ser. No. 597,273, July 18, 1975, abandoned. This application Mar. 23, 1976, Ser. No. 669,581
Claims priority, application Israel, July 30, 1974, 45369
Int. Cl.² B05B 1/30
U.S. Cl. 138—45 13 Claims



1. A flowrate control device comprising a housing, a housing inlet for coupling to a liquid flow supply, a housing outlet, a first housing wall portion defining a throughflow path communicating at the ends thereof respectively with said inlet and said outlet, a second housing wall portion defining a chamber communicating with said inlet and being otherwise closed, a flexible wall portion common to said first and second wall portions and serving as a separating partition between said chamber and said flowpath at least said first housing wall portion being formed with at least one tapering protrusion extending into said flowpath so as to form a constriction therein and being so shaped that upon maximum displacement of said flexible wall portion into said flowpath a permanent residual flowpath remains open.

4,023,596

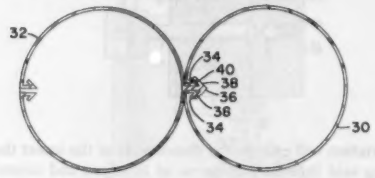
SECURING MEANS FOR MINIMUM WEIGHT AND VOLUME STRUCTURAL SUPPORTS

Sherman E. Tate, Rte. 3, Box 246, Hartselle, Ala. 35640

Filed Sept. 30, 1974, Ser. No. 510,523
Int. Cl.² F16L 9/18
U.S. Cl. 138—111 1 Claim

1. A support structure comprising a plurality of elongated ducts and means extending longitudinally along a longitudinal length of said ducts and interlocking the ducts together to lend structural support to the ducts, said ducts being made of sheet metal, said interlocking means including one of said ducts having an opening extending completely therethrough and

having flanges formed from said sheet metal at said opening by having opposing terminated sides of said sheet metal projecting inwardly relative to a center line longitudinally of said one of said ducts to define said opening between said opposing terminated sides, said interlocking means further including another of said ducts having a protrusion with lips thereon, said lips being positioned completely through said opening and interlocking with and completely overlapping said flanges



to secure said members together, said lips and protrusion extending the longitudinal length of said another duct and said opening also extending the longitudinal length of said one duct to provide a relative light and structurally supported support structure whereby said elongated ducts can be snapped together to form said support structure, and said flanges and said lips having adhesive placed therebetween to more securely fasten the duct members together and lend additional structural support to the support structure.

4,023,597

DISTRIBUTORS

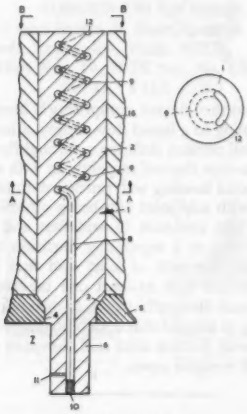
James Dennis Groves, Redcar, and Harold Edward Haigh, Norton-on-Tees, both of England, assignors to Tioxide Group Limited, Billingham, England

Filed Nov. 6, 1974, Ser. No. 521,380

Claims priority, application United Kingdom, Dec. 20, 1973, 59250/73

Int. Cl.² F16L 9/10

U.S. Cl. 138—178 **10 Claims**



1. In a gas distributor tube used in a fluidized bed treatment chamber to deliver a fulidizing gas to a fluidized bed of finely divided material; the improvement comprising said tube comprising a one-piece, molded, tube-like body having oppositely disposed first and second ends, said second end of said body being substantially flat, said body being formed of a substantially non-porous ceramic material; said first end being adapted to be mounted on a fluidized bed treatment chamber base plate with said second end disposed toward the interior of said chamber; means molded therein for passage of a fluidizing gas through said tube, said passage means extending through said body and forming a molded passageway; said passageway having an entrance adjacent said first end of said body and an outlet in said second end of said body, pressure reducing means at said entrance to said passageway, said passageway further comprising means molded integrally therewith for substantially preventing the downward flow of particulate material through said gas distributor tube; said downward flow preventing means comprising said molded passageway immediately adjacent said second end of said body being shaped to form a helical passage capable of substantially preventing the downward flow of particulate material therethrough; said passage being of circular cross section and having a diameter of from 0.25 inches to 0.5 inches; said helical passage being configured such that the shape of said outlet in said substantially flat second end is an elongated, arcuately curved oval; whereby the amount of finely divided material which can fall from the treatment chamber into the passageway is minimized, and erosion of said second end of said tube-like body does not substantially alter the shape of the passageway presented to the interior of the treatment chamber.

4,023,598

JACQUARD LIFTING WIRE

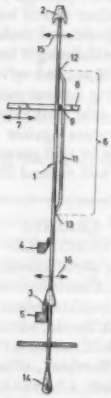
Robert Bucher, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jan. 20, 1976, Ser. No. 650,725

Claims priority, application Switzerland, Jan. 31, 1975, 1199/75

Int. Cl.² D03D 3/00, 3/08

U.S. Cl. 139—59 **7 Claims**



1. The combination of

a perforate bottom board;

a jacquard lifting wire for moving a heald of a weaving machine, said wire having a first hook for engagement with a griffe, a stop hook for engagement with a stationary stop member, said hook being disposed in spaced apart relation and a bottom end below said hooks extending through said board;

a pressing element for pressing against said wire within a pressing zone between said hooks to press said wire in a transverse direction; and

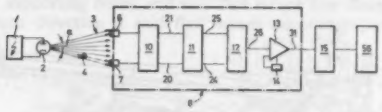
a reinforcing means for reinforcing said wire within said pressing zone and in said transverse direction.

4,023,599

OPTO-ELECTRONIC WEFT YARN DETECTOR

Klaus P. Zeleny, Constance, Germany, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 22, 1976, Ser. No. 668,926
Claims priority, application Switzerland, Mar. 21, 1975, 3623/74
Int. Cl.² D03D 51/34; G01N 21/30
U.S. Cl. 139—370.2 8 Claims



1. An opto-electronic weft yarn detector for a weaving machine having a pneumatic picking mechanism, said weft yarn detector comprising

a transmitting section having at least one radiation source for directing radiation transversely of a weft yarn picking direction;

a receiving section having an even number of radiation detectors for receiving radiation from said radiation source and a difference amplifier for producing signals corresponding to the received radiation on said detectors;

an evaluator for receiving and evaluating the signals produced by said difference amplifier during a given detection time period relative to a preset value; and

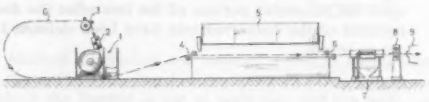
switching means for selectively stopping the weaving machine or operating a warning signal to stop the weaving machine, said switching means being connected to said evaluator to receive a switching signal therefrom in response to the evaluated signals falling below said preset value.

4,023,600

METHOD OF PRODUCING WIRE MESH

Gerhard Ritter, and Klaus Ritter, both of Graz, Austria, assignors to Firma Evg Entwicklungs-u Verwertungsgesellschaft, Graz, Austria

Filed Oct. 6, 1975, Ser. No. 619,950
Claims priority, application Austria, Oct. 10, 1974, 8179/74
Int. Cl.² B21F 27/10
U.S. Cl. 140—112 8 Claims



1. In a method of producing from rods wire mesh having relatively high elongation values and high pliability,

the steps comprising:

cold working unalloyed low carbon wire rods to reduce the thickness of each to a predetermined thickness;

thereafter forming said wire mesh from said wire rods including positioning said rods relative to each other and immobilizing them in said position; and

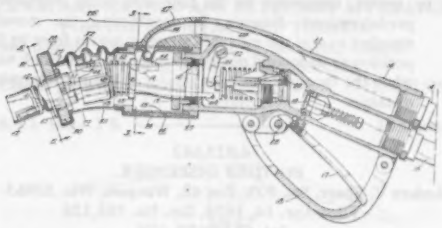
annealing said wire mesh at a temperature of from about 600° to about 1,000° C.

4,023,601

INTERLOCK SYSTEM FOR A GASOLINE DISPENSING NOZZLE WITH A VAPOR RECEIVING SYSTEM

William B. Hansel, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Sept. 2, 1975, Ser. No. 609,762
Int. Cl.² B65B 57/14
U.S. Cl. 141—207 3 Claims



1. In a fluid dispensing nozzle having,

a. a nozzle housing;

b. a discharge spout connected to the nozzle housing;

c. a main nozzle valve, located in the nozzle housing;

d. menas for controlling the position of the main nozzle valve to regulate the dispensing of fluid through the nozzle;

e. a pressure chamber located in the nozzle housing;

f. a vent line connected between the pressure chamber and the discharge end of the discharge spout;

g. means for creating fluid flow through the vent line and out through the pressure chamber in response to the flow of fluid through the nozzle;

h. means responsive to the pressure in the pressure chamber falling below a predetermined amount, for placing the nozzle valve controlling means in a disabling position so that dispensing of fluid is prevented; and

i. a vapor receiving system having a bellows section and a face seal connected thereto for contacting the fillpipe inlet;

an improvement comprising an interlock system for preventing the dispensing of fluid through the nozzle until the discharge spout of the nozzle is properly inserted in the fillpipe of the tank to be filled, said interlock system comprising:

j. an interlock valve mounted in the discharge spout and connected in the vent line so that fluid flow through the vent line is permitted when said valve is in its open position, and fluid flow through the vent line is prevented when said valve is in its closed position, said valve comprising,

i. a valve housing with a chamber therein, the chamber having a first side open to the outside of the housing,

ii. a valve seat mounted in said valve housing and in fluid communication with the chamber,

iii. first and second valve ports connected to the vent line,

iv. means for providing fluid communication between the valve seat and the first and second valve ports,

v. a flexible diaphragm sealably mounted across the open side of the chamber in the valve housing,

vi. a valve head mounted on the inside surface of the diaphragm so that movement of the diaphragm toward the valve seat a predetermined distance causes the valve head to contact the valve seat, thereby causing the valve to obtain a closed position,

vii. means for biasing the diaphragm and valve head away from the valve seat with the valve in its open position, and

viii. a valve stem mounted on the outside surface of the diaphragm; and

k. a movable member mounted on the discharge spout at or nearly at the location of the interlock valve, said movable

member having a contact surface such that when the member is in a first position the contact surface is against the valve stem, causing the interlock valve to obtain a closed position to prevent dispensing of liquid, and such that when the member obtains a second position, the contact surface no longer is against the valve stem, thereby permitting the interlock valve to obtain an open position, to enable dispensing of liquid;

l. means for biasing the movable member to its first position; and

m. means, responsive to the face seal being displaced a predetermined distance, for contacting the movable member so that the movable member moves from its first position to its second position to open the interlock valve when the face seal has been displaced the predetermined distance.

4,023,602

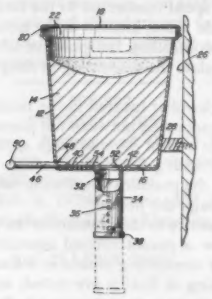
POWDER DISPENSER

Anders V. Sparr, Sr., P.O. Box 48, Waupun, Wis. 53963

Filed Apr. 14, 1975, Ser. No. 568,126

Int. Cl.² B65B *1/06*

U.S. Cl. 141—311 R **3 Claims**



1. A dispensing device for powder in which the powder will deteriorate and cake when exposed to moisture, said dispenser comprising a container having a removable closure lid and a discharge spout in the bottom thereof, said container including a flat bottom wall substantially larger than the discharge spout, said discharge spout being in the bottom wall and generally cylindrical in configuration and centrally located, a valve plate disposed against the upper surface of the bottom wall and forming a closure for the discharge spout, said valve plate having transverse dimensions smaller than the interior of the container for lateral movement in any direction along the upper surface of the bottom wall, handle means on said valve plate disposed exteriorly of the container for manually manipulating the valve plate for selectively opening and closing the spout, said valve plate being unrestricted and capable of movement in various directions within the container for agitating the powder therein to prevent bridging of the powder across the discharge spout thereby assuring discharge of powder, said valve plate including a single opening therein of a size similar to the discharge spout for selective alignment therewith, said opening in the valve plate being confined to an area remote from the handle means and including a tapering lateral extension extending toward the handle means to enable progressive increase or decrease in size of the portion of the opening in the valve plate which is in registry with the spout for controlling the discharge of powder from the container, said container being cylindrical, said valve plate having opposed arcuate surfaces conforming with the interior opposed arcuate surfaces of the container but having a transverse dimension substantially less than the bottom wall of the container to enable reciprocation of the valve plate with the powder always engaging the complete top surface of the valve plate serving to retain the valve plate downwardly in sealing relation to the bottom wall and to agitate powder engaged with the valve plate when it is moved.

4,023,603

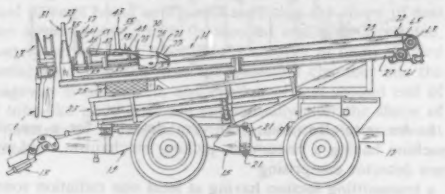
TREE TOP EJECTOR

Stanley K. Jasinski, and Frank A. Odorico, both of Woodstock, Canada, assignors to Eaton Yale Ltd., Woodstock, Canada

Filed Mar. 15, 1976, Ser. No. 667,062

Int. Cl.² A01G *23/08*

U.S. Cl. 144—2 Z **7 Claims**



1. An apparatus for processing a sheared tree trunk comprising:

a. a first fixed boom member oriented generally longitudinally of said apparatus;

b. means for gripping the tree trunk adjacent its butt end, operable to position the sheared tree lengthwise of said first boom member, the gripping means being disposed adjacent the forward end of the apparatus;

c. a second sliding boom member mounted above said fixed boom and longitudinally movable relative to the first boom member;

d. means for effecting relative movement between the first and second boom members;

e. shearing means mounted on the second boom adjacent the forward end of the second boom and longitudinally movable relative thereto;

f. delimbing means mounted on the second boom member and longitudinally movable relative to both the second boom member and the shearing means;

g. means for effecting movement of the delimbing means rearward relative to the second boom member in response to rearward movement of the second boom member relative to the first boom member;

h. means for effecting movement of the delimbing means forward relative to the second boom member in response to forward movement of the second boom member relative to the first boom member;

i. means interconnecting said shearing means and the delimbing means to permit longitudinal movement of the delimbing means away from the shearing means; and

j. an ejector attached to the second boom the ejector having an elevatable portion which rests between the delimbing means and the shearing means at a level below the tree trunk during delimbing and which can be activated to eject the remaining portion of the tree after the desired portions of the harvested tree have been delimbed and cut to length.

4,023,604

FLAIL TYPE TREE DELIMBING DEVICE

Michael Stadnick, Box 509, Swan River, Manitoba, Canada

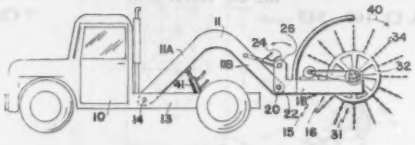
Continuation-in-part of Ser. No. 560,948, March 21, 1975, abandoned. This application Dec. 15, 1975, Ser. No. 640,410

Int. Cl.² B27L *1/00*

U.S. Cl. 144—2 Z **2 Claims**

1. A flail type delimbing machine for use with a source of power such as a skidder, truck or the like, comprising in combination a supporting frame, means to detachable secure said frame to said source of power, flail means, means mounting said flail means transversely within said frame for rotation

means including a supporting surface and a plurality of flexible flails secured by one end thereof to said supporting surface by centrifugal force when said flail means rotates, a shroud portion enclosing the rear upper quadrant of said flail means and being spaced from the distal ends of said flexible flails when said flexible flails are extended as aforesaid, means to pivotally connect said supporting frame to said source of power, fluid operating means extending between said source of power and said supporting frame to pivot said supporting frame in a vertical arc around said means to pivotally connect said supporting frame to said source of power, means whereby said supporting frame and said flail means free floats in the upward direction if said flail means encounters resistance



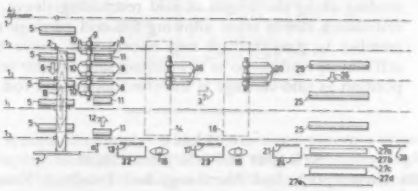
above a predetermined amount, in order to prevent damage from occurring to said flail means, said supporting frame including a pair of main arms pivotally secured by one end thereof of said source of power, a pair of secondary arms each pivotally secured by one end thereof to the other ends of one of said main arms, said flail means being journalled for rotation between said secondary arms, said fluid operating means extending between said source of power and said main arms, at least one link secured by one end thereof to said main arms intermediate the ends thereof and by the other end thereof to said shroud, and a frictionally controlled loose link connection between said link and said shroud whereby said flexible means by free-float upwardly as aforesaid.

4,023,605

METHOD FOR GRADING AND MEASURING LUMBER AND A TRIMMING DEVICE FOR PERFORMING SAID METHOD

Nils Erik Hellström, Nyland, and Bengt Artur Berg, Bollstabruk, both of Sweden, assignors to A B Hammars Mekanisha Verkstad, Nyland, Sweden

Filed Apr. 25, 1975, Ser. No. 571,570
Claims priority, application Sweden, May 8, 1974, 7406147
Int. Cl.² B27B *1/00, 5/06, 31/04*
U.S. Cl. 144—312 **15 Claims**



1. Method for grading and measuring lumber during transport thereof in a running direction through a trimming device in which the lumber is cut at both root and top ends, said method comprising the steps of:

A. initially making the root end cut,

B. transporting the remanent thereafter in a direction transverse to its running direction to a stop located in its path so as to fix the location at which the first top end cut is made,

C. making a first top end cut by severing from the top end a length less than one length module unit to provide a remanent portion which is a lengthwise multiple of a length module unit,

D. rotating the resulting remanent portion for inspection thereof to determine the presence or absence of defects,

E. thereafter transporting said inspected remanent portion to a final cutting device, and

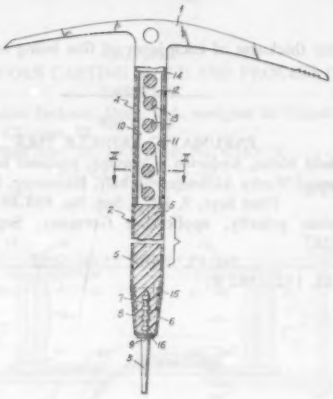
F. if defects have been detected, severing said inspected remanent portion to any one of several length module units by making an additional top end cut with said final cutting device.

4,023,606

ICE AX, AND METHOD AND EXTRUSION APPARATUS FOR THE MANUFACTURE THEREOF

Franz Kneissl, Aug. Scherlstrasse 12, Kufstein, Austria

Filed Feb. 5, 1976, Ser. No. 655,356
Claims priority, application Austria, Feb. 5, 1975, 851/75
Int. Cl.² B25G *1/10*
U.S. Cl. 145—2 R **10 Claims**



1. An ice ax comprising:

a pickax blade,

a pickax spur;

a handle projecting transversely from said blade connecting said spur and said blade and having a plastic jacket of oval cross section defining a core area of foamed plastic material, and

a pair of rigid members, each member being fixedly attached to said blade and extending opposite one another lengthwise from said blade along the inside surface of the curvature peaks of the oval cross section of said jacket and being connected by a rigid bridge member extending through said core and being of substantially smaller volume than the volume of said core area.

4,023,607

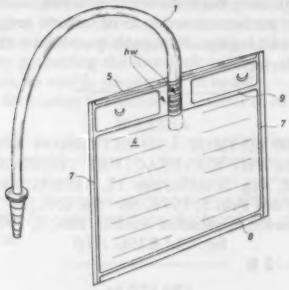
POLYETHYLENE URINE BAG WITH TUBE

Ole Roger Jensen, Copenhagen N., and Preben Kobbero, Brondby Strand, both of Denmark, assignors to Automaticon A/S, Denmark

Filed June 2, 1975, Ser. No. 583,179
Claims priority, application United Kingdom, June 7, 1974, 25467/74
Int. Cl.² B65D *33/00*
U.S. Cl. 150—1 **1 Claim**

1. A bag such as a urine bag consisting of two layers of film of polyethylene directly welded together along their edges except at an aperture in the upper edge, in which aperture one end of a tube of the same material is inserted, characterized in that the connection between the entire circumference of the

tube and the sides of the bag aperture is produced in liquid and airtight condition by heat welding including impulse welding, the thickness of each layer of film being less than 0.10 mm.



4,023,608

PNEUMATIC VEHICLE TIRE

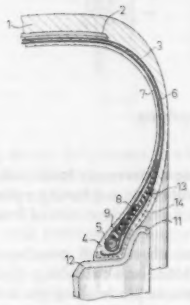
Barthold Meiss, Anderten, Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Filed Sept. 9, 1974, Ser. No. 504,492

Claims priority, application Germany, Sept. 8, 1973, 2345387

Int. Cl.² B60C *15/06, 9/02*

U.S. Cl. 152—362 R **6 Claims**



1. A pneumatic vehicle tire with beads each including a core and with tire shoulders which includes in combination: a multilayer carcass having inner and outer carcass layers thereof looped around said beads to anchor said said layers thereon and each having a turn-up portion, rubber profile means of triangular cross section each including an overlapping portion respectively arranged on said bead cores and laterally engaging the inner carcass layer, and rubber plate means each including a lower portion and an upper portion respectively arranged radially inwardly near said bead cores and having opposite side surfaces engaged by said inner and outer carcass layers respectively radially outwardly and also radially inwardly subject to interposing of said rubber profile means looped within the inner layer, said rubber plate means having both rim portions adjacent said bead cores and rim portions opposite to said first mentioned rim portions tapering to a sharp edge, each of said rubber plate means having a hardness in a range at a value always greater than that of said rubber profile means and covering a distance from the respective adjacent bead core in the direction toward the respective adjacent tire shoulder over a length amounting to up to one-half of the pertaining tire side wall, said inner carcass layer wrapping around said bead core and the rubber profile means and extending between said rubber profile means and the overlapping portion of said rubber plate means, said lower portion of said plate means extending between the turn-up portion of the inner carcass layer and the outer carcass layer and the upper portion of said rubber plate portion extending up to one-half the height of the side wall and being positioned between said inner and outer carcass layers.

4,023,609

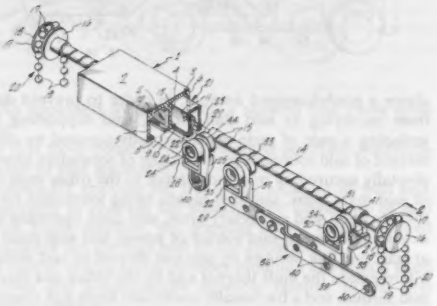
DRAPERY TRACK

Kurt E. Rosenquist, Pacific Palisades, Calif., assignor to Louver Drape, Inc., Santa Monica, Calif.

Filed June 3, 1975, Ser. No. 583,279

Int. Cl.² A47H *5/06*

U.S. Cl. 160—343 **7 Claims**



1. A drapery track comprising:

a channel member;

a rod, said rod being located within said channel member;

operating means coupled with said rod whereby said operating means provides for the rotation of said rod;

a carriage, said carriage having a drive member engaging said rod, whereby rotation of said rod causes said carriage to traverse along said rod; and

a resilient restraining sleeve located about said rod, said sleeve being positioned between said channel member and said rod, said sleeve providing said carriage drive member access to said rod, wherein said resilient sleeve is positioned annularly in a sealing relationship about said rod, said sleeve being provided with a lateral seam extending along the length of said restraining sleeve, said restraining sleeve seam allowing for said carriage drive member to pass through said sleeve, said sleeve being sufficiently resilient so as to maintain said annular sealing position as said carriage is traversed along said rod.

4,023,610

STRAND SUPPORT METHOD

Fritz Kirstenpfad, Bad Harzburg, and Friedrich Konning, Wittlaer, both of Germany, assignors to Demag, A.G., Germany

Filed Oct. 6, 1975, Ser. No. 620,223

Claims priority, application Germany, Oct. 7, 1974, 2447800

Int. Cl.² B22D *11/12*

U.S. Cl. 164—4 **2 Claims**

1. In a method for supporting a freshly cast steel strand to maintain the integrity of the hardened shell thereof against rupture caused by ferrostatic pressure created by the still molten core, characterized by the steps of

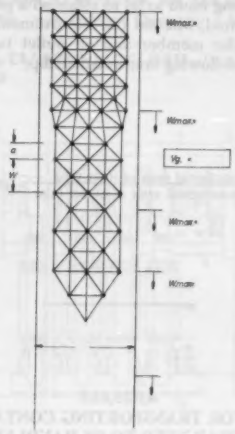
a. casting the steel strand;

b. measuring the distance between the level of metal in the casting mold and the initial point of support;

c. measuring the casting velocity of the strand; and

d. providing a multiple point contact support for the freshly

cast strand, with the distance W in centimeters between each point of contact longitudinally and transversely of the moving strand being determined by the formula



$$W = (42 + 8\ L/Vg)$$

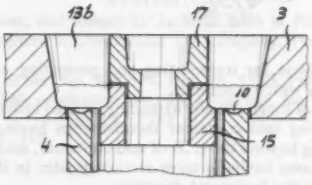
wherein L is the distance in meters from step (b) and Vg is the velocity from step (c) in meters per minute.

4,023,611

METHOD OF WELDING PIPES ONTO PRESSURE CONVEYING ELEMENTS, ESPECIALLY PIPE PLATES, PRESSURE CONTAINERS AND COLLECTORS

Kurt Clemens; Kurt Wollenweber; Hans Bruninghaus, all of Gummersbach, and Konrad Nies, Wiehl, all of Germany, assignors to L. & C. Steinmuller GmbH, Gummersbach, Germany

Filed May 17, 1976, Ser. No. 686,953
Int. Cl.² B22D *19/04, 31/00*
U.S. Cl. 164—69 **9 Claims**



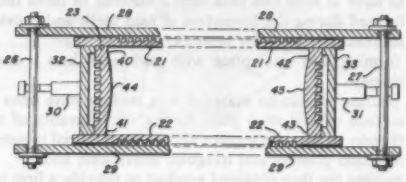
1. A method of applying and connecting a pipe to a pressure conveying element having a bore with a diameter slightly greater than the outer diameter of the pipe to be applied and to be connected to said pressure-conveying element and also having an opening adjacent to said bore with a diameter greater than that of said bore so as to form on said conveying element radially inwardly extending lip means, providing the inside and outside of the pipe to be applied within the region of its intended connection to said conveying element with inner and outer lips respectively, introducing the thus prepared pipe into said bore so that one end of said outer lip is substantially flush with said radially inwardly extending lip means, connecting said outer lip means to said lip by root-welding, preparing a centering bushing with a first section having an outer diameter slightly less than the inner diameter of said inner lip and having a second section of a lesser diameter and projecting beyond said first section, introducing the thus prepared centering bushing into said pipe so that said second section of said bushing projects upwardly into said opening of said pressure conveying element whereas that end of said first section which is adjacent to said second section is substantially flush with the adjacent end of the inner lip of said pipe, and filling the annular space between the inner wall of said opening and the outer peripheral wall surface of said second section with welding material for creating a welding connection between said inner lip with said bushing.

4,023,612

CONTINUOUS CASTING MOLD AND PROCESS OF CASTING

Charles Richard Jackson, Dyer, Ind., assignor to Inland Steel Company, Chicago, Ill.

Filed Nov. 25, 1975, Ser. No. 635,078
Int. Cl.² B22D *11/04*
U.S. Cl. 164—82 **6 Claims**



1. In a mold for continuously casting steel slabs employing spaced substantially parallel longitudinal walls and spaced transverse walls having oppositely disposed inwardly tapered inner surfaces, the improvement which comprises; transverse walls having flat sections which extend inwardly from the opposite longitudinal edges thereof disposed perpendicular to said longitudinal walls having the inner ends of said flat sections connected by a convex section, and said transverse wall having an inner surface characterized by resistance to wear along said flat sections; whereby the frequency with which the said transverse walls require reworking in order to maintain said walls in satisfactory working conditon is substantially reduced.

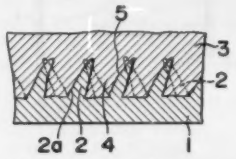
6. A continuous process for casting a steel slab in the form of an endless strand which reduces the frequency the transverse narrow end walls of a continuous casting mold need reworking in order to maintain the slab mold in satisfactory working condition comprising; continuously introducing molten metal into a water cooled open ended vertically disposed generally rectangular mold which forms a solidified steel shell enclosing a liquid core with said mold having spaced parallel longitudinal walls forming flat side walls of said casting and coacting spaced transverse walls having oppositely disposed inwardly tapered inner surfaces forming narrow end walls of said casting, said transverse walls having flat sections extending inwardly from each of the longitudinal edges thereof perpendicular to said longitudinal walls having a length at least at the lower end of said mold about equal to the thickness of the shell forming the side walls of the casting at the point the casting is withdrawn from the mold with a convex section connecting the inner ends of said flat sections, and withdrawing said casting from said mold between spaced oppositely disposed planar containment rolls which engage the side walls of said casting below the lower end of said mold.

4,023,613

METHOD OF MAKING A COMPOSITE METAL CASTING

Yositaka Uebayasi; Hiroshi Kumon; Michinobu Yamada, and Yoshikazu Oe, all of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Division of Ser. No. 623,005, Oct. 16, 1975, which is a continuation of Ser. No. 317,684, Dec. 22, 1972, abandoned. This application Mar. 1, 1976, Ser. No. 663,195
Claims priority, application Japan, Dec. 29, 1971, 47-3108
Int. Cl.² B22D *19/08*
U.S. Cl. 164—100 5 Claims



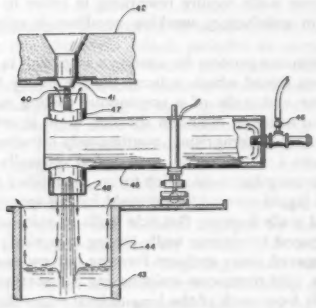
1. A method of making a metal casting composed of a steel plate and aluminum material interlocked with said steel plate, which comprises the steps of:
   a. providing the steel plate having opposed surfaces;
   b. raising up the skin of said steel plate from at least one of said opposed surface for forming a plurality of teeth with primary interstices therebetween and causing said teeth to have at least one face with a number of flaws therein formed during the formation of said teeth and providing substantially irregular interstices;
   c. forming said steel plate with said teeth into a desired shape;
   d. pouring aluminum material in a molten state onto said surface of said steel plate having said plurality of teeth therein so that the molten aluminum material penetrates into said primary and irregular interstices; and
   e. cooling the thus obtained product to provide a firm interlocking between said steel plate and said aluminum material upon solidification thereof.

4,023,614

GAS SHROUD

Bernard Robert Pollard, Aliquippa, Pa., assignor to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Filed Apr. 2, 1976, Ser. No. 673,231
Int. Cl.² B22D *11/10*
U.S. Cl. 164—259 2 Claims



1. In the combination of shrouding apparatus comprising an open-ended outlet tubular member, positioned between molten metal distribution means and a continuous casting mold, and an inlet tubular member connected to said outlet tubular member so as to form an interconnecting passageway for passage of protective gas between said tubular members, and gas delivery means connected to said inlet tubular member for passing a protective gas into and through said inlet tubular member so as to cause protective gas to exit from the open ends of said outlet tubular member and pass into and fill said continuous casting mold so as to establish a protective atmosphere in said mold, wherein the improvement comprises:
   an inlet tubular member and an outlet tubular member having the following area relationship;

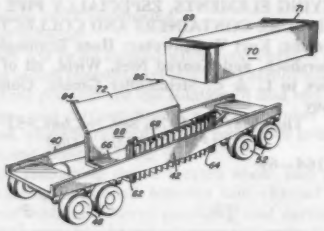
$$\frac{\text{cross-sectional area of inlet tube}}{2 \times \text{cross-sectional area of outlet tube}} \geq \text{about } 0.7.$$

4,023,615

VEHICLE FOR TRANSPORTING CONTAINER FOR MATERIALS THAT NEED TO BE HANDLED WITH CARE

Stanton L. Reese, 11409 Duryea Drive, Potomac, Md. 20854

Continuation-in-part of Ser. No. 109,925, Jan. 26, 1971, Pat. No. 3,727,059. This application Jan. 18, 1973, Ser. No. 324,576
Int. Cl.² B60P *3/00*
U.S. Cl. 165—41 12 Claims



1. A vehicle for transporting and protecting a container from injury which comprises:
   a. a pair of longitudinally extending, spaced apart beams for receiving said container therebetween having ends extending beyond the ends of said container, said longitudinal beams having a cross-section greater in the vertical than in the horizontal direction;
   b. a pair of end beams interconnecting and adjacent each end of said longitudinal beams, said end beams having a cross-section greater in the horizontal than in the vertical direction;
   c. at least two longitudinally spaced apart yoke means rigidly interconnecting said longitudinal beams and positioned therebetween, each said yoke means comprising at least two vertical supports attached directly to one of said beams, said yoke means further comprising at least two horizontal supports interconnecting and attached to said at least two vertical supports at each end, said yoke means extending above and below said longitudinal beams;
   d. said container supported and secured by said yoke means and said longitudinal beams such that said container is prevented from contacting a surface on which said vehicle is supported regardless of its position with respect to said surface; and
   e. at least one wheel for allowing said vehicle to be transported.

4,023,616

THYRISTOR COOLING ARRANGEMENT

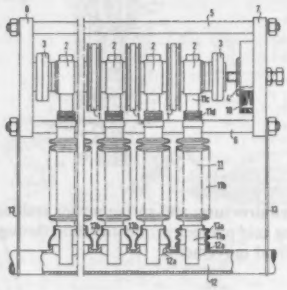
Friedrich Scherbaum, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 7, 1975, Ser. No. 565,677

Claims priority, application Germany, Apr. 8, 1974, 2417031

Int. Cl.² F28D 15/00; H01L 23/42

U.S. Cl. 165—80 7 Claims



1. In a liquid cooled thyristor column in which a plurality of disk thyristors are stacked and clamped in an electrically conducting manner between heat sinks such that each thyristor has a heat sink on each side thereof, the heat sinks also being used for conducting current, the improvement comprising:

a. a heat pipe inserted through each heat sink and projecting therefrom, each heat pipe including an intermediate section of electrically insulating material and an elastic section between the electrically insulating intermediate section and the heat sink;

b. a liquid coolant line; and

c. membranes coupled the free end of each heat pipe to said coolant line.

4,023,617

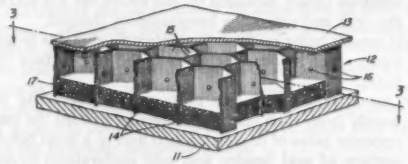
CONSTRUCTION HAVING INTEGRAL CIRCULATORY SYSTEM

Jon R. Carlson, and Robert G. Jackson, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Division of Ser. No. 428,554, Dec. 26, 1973, Pat. No. 3,895,152. This application Dec. 18, 1974, Ser. No. 533,914

Int. Cl.² F28F 3/12

U.S. Cl. 165—169 4 Claims



1. In combination, (A) a cryogenic liquid storage vessel comprising a load-bearing wall, a primary barrier layer of impermeable polyurethane foam, a circulatory system disposed therebetween defined by a network of cells having side walls which are generally in lateral orientation to the primary barrier layer and the load-bearing wall, at least some of said side walls having apertures therein thereby providing means whereby each cell is in communication with at least one adjacent cell in a manner defining a continuous controlled circulatory path passing through each cell of said network, and a secondary barrier layer of impermeable polyurethane foam partially filling the cells in the region between the apertures and adjacent the load-bearing wall, and (B) means for circulating a fluid through said circulatory system.

4,023,618

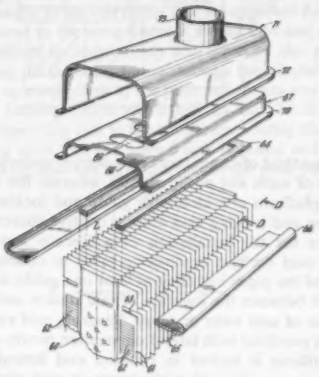
HEAT EXCHANGER HEADERING ARRANGEMENT

Leslie C. Kun, Williamsville, and Kit F. Burr, Clarence Center, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,420

Int. Cl.² F28F 9/16

U.S. Cl. 165—175 28 Claims



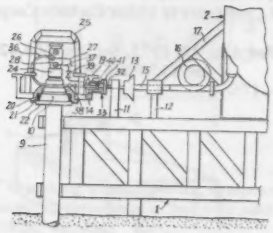
1. In a heat exchanger assembly comprising: a stacked array of heat exchange channel elements, wherein each channel element is bounded by thermally conductive pressure withholding walls of between 0.003 and 0.150 inch thickness, with a first fluid entrance opening at one end, a first fluid exit opening at the opposite end, and end sections having a cross section bounded by flat side wall portions and edge wall portions and wherein adjacent channel elements in said array are stacked with their flat side wall portions in wall to wall contacting relationship and their edge wall portions in alignment to form a first fluid entrance face at one end of said array and a first fluid exit face at the opposite end of said array, each said face having a perimeter defined by edge wall portion ends of the stacked channel elements and side wall portion ends of the outermost channel elements in said array, and with said pressure withholding walls of adjacent channel elements in the interior of said array being disposed in spaced relationship with respect to each other for flow of a second fluid through said array in the space betweem said channel elements in heat exchange with said first fluid; inlet header means joined in flow communication with said first fluid entrance face for introduction of first fluid to said channel elements, and outlet header means joined in flow communication with said first fluid exit face for withdrawal of first fluid from said channel elements, each said header means comprising the improvement of a resilient gasket disposed around said perimeter of a said face against the wall portion ends thereof; header tank means enclosing said face, having a wall surface portion abuttingly disposed against said resilient gasket and a structurally integral flange member extending outwardly from said stacked array; and means joining said flange member and another structurally rigid part of said heat exchanger assembly to cause said wall surface portion of said header tank means to bear compressively against said resilient gasket for fluid-tight sealing between the header tank and said stacked array.

4,023,619

METHOD OF CONNECTING OF AN UNDERSEA CENTRAL STATION TO A GROUP OF UNDERSEA WELLS AND OUTFLOW PIPES

Roger Andre Marie Marquaire, La Celle St. Cloud; Michel Georges August Curtis, Lyon, both of France, and Robert Edouard Schappel, London, England, assignors to Subsea Equipment Associates Limited, Hamilton, Bermuda

Filed Apr. 7, 1975, Ser. No. 565,971
Claims priority, application France, Apr. 5, 1974, 74.12175
Int. Cl.² E21B *33/035*
U.S. Cl. 166—.6 **12 Claims**



1. A method of connection of a central undersea station to a group of wells and outflow pipes, wherein the station locks onto a platform provided with guide and locking means for receiving and locking said station relative thereto as well as locations for the installation of wellheads serviced by the station, said method comprising prior to connection of the wells and the pipes installing at least one guide means on said platform between the location of said station and each of the locations of said wells or pipes, lowering said central station which is provided with lateral connection means so that when said platform is locked in position said lateral connection means are opposite said guide means on said platform, lowering onto said other locations at least one placing structure and at least one connecting structure, said connecting structure being lowered by means of a diving-bell resting in a watertight manner on a bearing surface on said connecting structure, orientating said bell so that said structure presents a lateral connection means cooperating with said guide means on the said platform and a connector ensuring watertightness of the well or the said pipe with said structure, manually connecting inside said bell a sub-assembly to the lining of said well or to said pipe and at least one pipe system between said sub-assembly and said lateral connection means on said structure so as to ensure continuity of said lining or of said pipe with said lateral connection means, controlling joining of said connection means on the structure to said lateral connection means on the said central station and thereafter raising said bell.

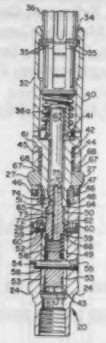
4,023,620

NO-GO BOMB HANGER

Imre I. Gazda, Saginaw, and Albert W. Carroll, Dallas, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Feb. 17, 1976, Ser. No. 658,460
Int. Cl.² E21B *23/00*
U.S. Cl. 166—217 **31 Claims**

1. A well equipment hanger constructed for engaging a no-go shoulder in well tubing and settable in place in a well including: housing means; lug lock means slidably mounted in slot means of said housing means for guided movement between an inner withdrawn state and an outward position; cam member means mounted for longitudinal sliding movement within said housing, shaped to cam said lug lock means through the range of movement from said inner and withdrawn state to the outward position; interference lock means positionable for locking said cam means from movement relative to said housing means and in position to back said lug lock means in said outward position; locking member means positionable for unlock moving said interference lock means from the interference lock state to a lock release position; wherein said locking member means is a resiliently displaceable plunger structure; and spring means resiliently longitudinally biasing said plunger in one direction throughout its range of longitudinal movement.

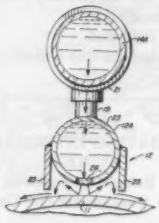


4,023,621

WATER BLANKET DELUGE SYSTEM

Benjamin F. Olson, 819 W. 22nd St., No. 2, Tempe, Ariz. 85282

Filed June 21, 1976, Ser. No. 697,726
Int. Cl.² A62C *35/22*
U.S. Cl. 169—68 **10 Claims**



1. A liquid deluge device for delivering a continuous layer of liquid over the surface of a metal tank to keep it cool comprising:

a liquid discharge header of one or more fluid conducting conduits rigidly mounted on and above the top surface of the tank and extending longitudinally thereof,

said header being perforated at intervals along its length for discharging liquid directly onto the top surface of the tank,

an apron comprising two portions one extending downwardly from each side of said header toward the tank on opposite sides of its longitudinal axis to a level below the surface of said header and said perforations juxtapositioned to the tank,

said portions extending substantially the full length of the header,

whereby liquid under pressure released by said perforations strikes the surface of the tank at substantially a right angle thereto, rebounds angularly away therefrom within said aprons,

the liquid substantially filling the inside of said aprons being discharged therefrom in a continuous sheet through the spacing between the edges of said portions of the apron juxtapositioned to the tank and the surface of the tank and flowing over and hugging the surface of the tank to

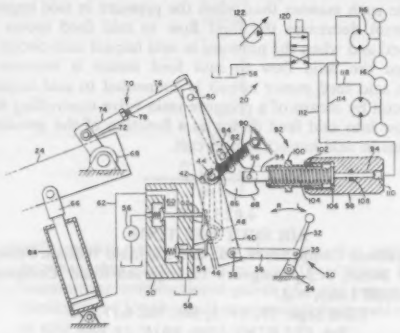
substantially the bottom of the tank where it drops away therefrom.

4,023,622

TRACTOR WITH DRAFT LOAD CONTROL

Stanley Martin Gregerson, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Sept. 15, 1975, Ser. No. 613,548
Int. Cl.[2] A01B *63/112*
U.S. Cl. 172—9 2 Claims



1. In a tractor having an engine, a pair of main drive wheels, a pair of hydraulic wheel motors including output shafts operatively connected to the main drive wheels, a hydraulic pump driven by the engine to provide pressurized fluid, a hydraulic system operatively interconnecting the pump and the motors to supply pressurized fluid from the pump to the motors, adjustable hitch means adapted to support an integral or semi-integral ground working implement, position sensing link means proportionally movable with the hitch means in accordance with the adjustment thereof, hydraulic adjusting means for raising or lowering the hitch means and any implement supported thereby, a fluid pressure source for the hydraulic adjusting means, valve means for permitting or blocking the flow of fluid to and from the hydraulic adjusting means to respectively raise and lower the hitch means, a draft control system comprising: pressure sensing means including a body member having a longitudinal bore therein connected at one end to the hydraulic system and slidingly sealed at the other by piston means urged in one direction by the fluid pressure in the transmission means, and urged in a direction opposite to the one direction by biasing means; pressure sensing link means pivotally connected to the piston means at one end, slidingly engaging the position sensing link means at the end opposite the one end, and slidingly abutting valve link means for controlling the valve means to allow flow of fluid to the hydraulic adjusting means in response to increasing fluid pressure in the transmission means above a predetermined valve and to allow flow of fluid from the hydraulic adjusting means in response to raising of the hitch means as sensed by the position sensing means; and biasing means urging the valve link means to control the valve means to allow flow of fluid from the hydraulic adjusting means.

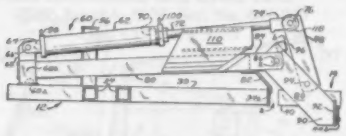
4,023,623

CULTURAL IMPLEMENT WITH FOLDABLE TOOL SUPPORTING FRAME

Charles W. Anderson, Kewanee, Ill., assignor to Chromalloy American Corporation, St. Louis, Mo.

Filed Jan. 26, 1976, Ser. No. 652,490
Int. Cl.[2] A01B *63/32*
U.S. Cl. 172—311 20 Claims

9. In an agricultural implement having a tool supporting main frame and a tool supporting wing frame hinged to one side of the main frame to swing on a horizontal hinge axis between a storage position over the main frame and a generally horizontal working position outboard of its main frame, the combination of a hinge link rigidly connected to said wing frame which swings on the hinge axis, an operating link having one end portion pivotally connected to the wing frame adjacent the rigid connection of the latter to the hinge link, and push pull means disposed over the main frame and pivotally connected at one end to said main frame inboard of the hinge axis and having its other end pivotally connected to the operating link, guide means in which the pivotal connection of the push pull means to the operating link is supported for straight line movement as the wing frame is swung into and out of its storage position in response to the force of the push pull means acting on the wing frame through the pivotal connections of the operating link to the push pull means and the wing frame, and locking means which solidify the pivotal connection of the operating link to the wing frame during the interval of the swing such that the wing frame is raised and lowered into its working position by said forces of the push pull means.

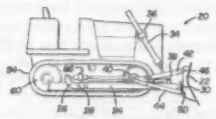


4,023,624

BLADE ANGLE ADJUSTMENT MECHANISM FOR BULLDOZER OR THE LIKE

Claude M. Frisbee, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Aug. 19, 1976, Ser. No. 715,788
Int. Cl.[2] E02F *3/76*
U.S. Cl. 172—805 12 Claims



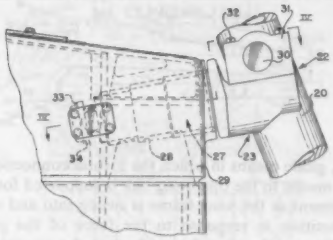
10. An angle adjustment mechanism for a vehicle blade, the assembly including a vehicle, a frame support for said blade having side frame portions on opposed sides of said vehicle and a generally vertical blade transversely mounted on said vehicle frame, said angle adjustment mechanism comprising:

a slide member slidably mounted on each of said side frame members for sliding extension toward and away from said blade, said slide members operably connected to the adjacent sides of said blade, a rod supported above and generally parallel to each of said side frame members, with at least one rod slidably supported for movement toward and away from said blade, said rods having a plurality of spaced apertures, latch means including a latch pin retaining said slide members in one of said rod apertures and a power extender interconnecting said one slidably supported rod and said frame for extending said rod toward and away from said blade.

4,023,625
STRUCTURE MOUNTING A BULLDOZER ASSEMBLY TO A VEHICLE

Ronald L. Krolak, Morton; George F. Alexander, Pekin, and Eldon D. Oestmann, Morton, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 5, 1975, Ser. No. 610,705
Int. Cl.² E02F 3/76; A01B 71/04, 71/08
U.S. Cl. 172—809 12 Claims

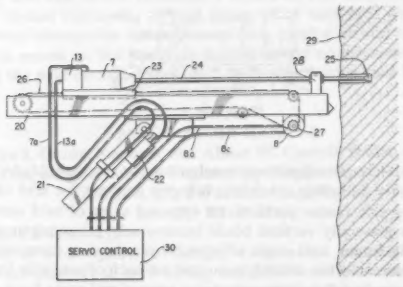


1. In a vehicle having a frame, an engine coolant radiator carried on said frame, and a bulldozer assembly pivotally carried on said frame, the improvement comprising: a radiator guard for protecting said radiator, said guard having corner portions adjacent the upper lateral corners of the radiator, each said corner portion defining a forwardly opening socket formed integrally therein, said radiator guard defining a rigid U-shaped assembly further including side portions and an upper cross portion, said corner portions being secured to the opposite ends of the cross portion and to the upper end of the side portions; and lift jack means having portions connected to said bulldozer assembly and mounting portions received in said sockets for adjustably mounting the lift jack means to said radiator guard.

4,023,626
SELF-ADAPTIVE HYDRAULIC ROCK DRILL

Pekka Salmi, and Rolf Strom, both of Tampere, Finland, assignors to Oy Tampella AB, Tampere, Finland

Continuation-in-part of Ser. No. 558,805, March 17, 1975, Pat. No. 3,979,944. This application June 18, 1975, Ser. No. 588,061
Int. Cl.² E21C 3/20
U.S. Cl. 173—8 14 Claims

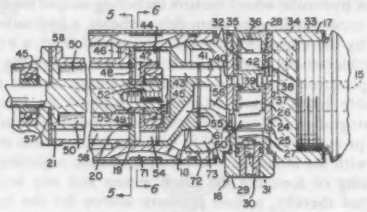


1. A servo system for a hydraulic drill comprising a first circuit supplying pressurized fluid to a drill impact unit, a second circuit providing pressurized hydraulic fluid flow to a drill rotation motor and a third circuit providing fluid flow to a feed motor for advancing or retracting the drill, said servo system comprising separate pumps for supplying pressurized fluid flow to each of said circuits, a first valve shunting said impact unit circuit and operating as a function of the pressure of the fluid in said rotation motor circuit in such manner that when the pressure in said rotation motor circuit increases beyond a predetermined value said first valve release flow from said impact unit circuit for lowering the pressure therein to cause the power of said impact unit to be decreased, a second valve controlled as a function of the pressure in said rotation motor circuit such that when the pressure therein falls between a predetermined value said second valve is opened to release flow from said impact unit circuit for lowering the pressure therein whereby the power of said impact unit is decreased, and a third valve disposed in said feed motor circuit controlled by the pressure variations in said impact unit circuit in such manner than when the pressure in said impact unit circuit decreases the fluid flow to said feed motor is decreased and when the pressure in said impact unit circuit is increased the fluid flow to said feed motor is increased, wherein said feed motor circuit is connected to said impact unit circuit by means of a pressure ratio valve controlling the fluid flow into said feed motor as a function of the pressure variations in said impact unit circuit.

4,023,627
AIR SHUT-OFF TOOL

John Madison Clapp, Sayre, Pa., and Reginald William Pauley, Belle Mead, N.J., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Sept. 29, 1975, Ser. No. 617,320
Int. Cl.² B23Q 5/06; F01C 21/12
U.S. Cl. 173—12 8 Claims



1. A pressure fluid operated tool comprising:
a pressure fluid rotary motor operating a tool;
a housing to contain said motor, said housing having a passageway for supplying pressure fluid under pressure to said motor;
a shut-off valve for establishing open and closed fluid flow conditions in said passageway;
a pressure differential operated valve in said passageway between said motor and said shut-off valve for interrupting the flow of fluid in response to a pressure differential, said pressure differential operated valve communicating on one side with said passageway; and
means for transferring discrete quantities of pressure fluid in sequence from said passageway proportional to motor speed and independent of the fluid expanded in driving said motor and creating a pressure signal thereby and applying said pressure signal to the other side of said pressure differential operated valve to operate said pressure differential operated valve to shut off said motor.

4,023,628
DRILLING DEVICE UTILIZING SONIC RESONANT TORSIONAL RECTIFIER

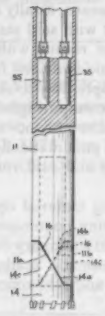
Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Apr. 30, 1976, Ser. No. 682,017
Int. Cl.² E21C 3/06
U.S. Cl. 175—56 6 Claims

1. In a sonic drilling device,
a torsionally elastic member,

periodic torsional force means directly coupled to said member for torsionally oscillating said member about its longitudinal axis at a torsional resonant frequency,

a cutting tool, and



rectifier means coupled to said elastic member and located between the elastic member and the cutting tool for transmitting unidirectional pulses of sonic energy having torsional and longitudinal components from said member to said tool.

4,023,629

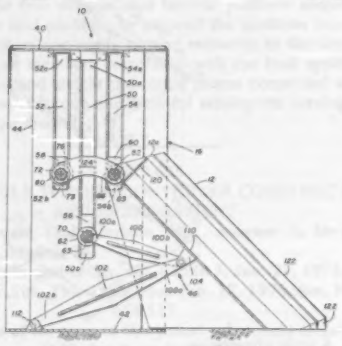
TOGGLE ACTUATED UNDERREAMER

David L. Watson, Fort Worth, Tex., assignor to Watson, Incorporated, Fort Worth, Tex.

Filed June 25, 1976, Ser. No. 699,783

Int. Cl.² E02D *17/148*

U.S. Cl. 175—285 **13 Claims**



1. An underreamer apparatus for belling out a portion of an underground hole into a conical configuration comprising:

a vertically elongated housing having an upper and lower portion;

a plurality of underreamer doors, each pivotally connected at the upper portion of the housing to an associated upper shaft within the housing;

each of the doors including a toggle mechanism wherein each toggle mechanism includes first and second arms, having first and second ends respectively, the first ends of said first and second arms being pivotally connected to each other and centrally to one of the doors by a common axis, the second end of the first arm being pivotally connected to a central shaft within the housing and the second end of the second arm being pivotally connected to the lower portion of the housing; and

means for actuating the toggle means to pivot the doors between a first retracted position within the housing and a second position swung outwardly along an arcuate path thereof.

4,023,630

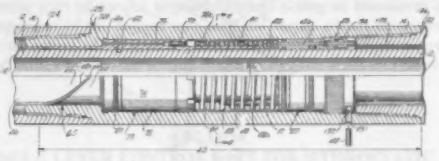
WELL JAR HAVING A TIME DELAY SECTION

Gregg S. Perkin, Redondo Beach; Glen Robinson, Oakview, and Theodore G. Thometz, Long Beach, all of Calif., assignors to Smith International, Inc., Irvine, Calif.

Filed Jan. 14, 1976, Ser. No. 649,037

Int. Cl.² E21B *1/10*

U.S. Cl. 175—297 **37 Claims**



1. A well jar comprising:

telescoping inner mandrel and outer body elements;

a connector on each of said telescoping elements;

torque drive between said telescoping elements and adapted to permit relative longitudinal movement therebetween;

an intermediate element rotatably mounted relative to and intermediate to said telescoping elements and affixed longitudinally relative to a first one of said telescoping elements;

a releasable latch connected between said intermediate element and one of said telescoping elements, said releasable latch preventing relative longitudinal movement of said intermediate and telescoping elements and, upon application of at least a predetermined longitudinal force, causing relative rotation between said intermediate and said one telescoping elements to a release position, said intermediate and said one telescoping elements when in said release position allowing longitudinal movement of said telescoping elements;

time delay means connected between the intermediate element and one of said telescoping elements for restraining such relative rotational movement to the release position for a preselected time interval of application of such predetermined longitudinal force; and

hammer means comprising coacting impact faces, at least one on each of said telescoping elements, positioned for contact at an end of such longitudinal movement.

4,023,631

ADJUSTABLE BALANCE AND INDICATING DEVICE

Donald R. Langevin, 3117 SE. 19th Ave., Cape Coral, Fla. 33904

Filed Dec. 4, 1975, Ser. No. 637,735

Int. Cl.² G01G *23/18*, *23/14*

U.S. Cl. 177—46 **20 Claims**

1. An adjustable balance and indicating device for removably attaching to a beam scale of the type having a balance beam with a distended end thereof movable in an oscillating plane and having further a support adjacent said balance beam, said adjustable balance and indicating device comprising:

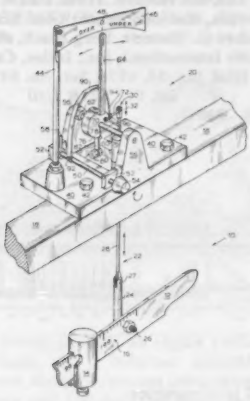
a bracket for removably mounting to said support adjacent said balance beam;

a coupler having a first end thereof coupled to said balance beam and a second end spaced therefrom;

indicating means for indicating the displacement of said second end of said coupler from a reference position

representative of said balance beam being in a balancing condition; and

adjustable biasing means for providing a biasing force on said second end of said coupler for displacing said second end to said reference position and thereby balancing said



balance beam scale, with said adjustable biasing means comprising a deformable member coupled about a first end thereof to said bracket and coupled about a second end thereof to said second end of said coupler, with said deformable member being bowed between said first and second ends for providing a first force therebetween.

4,023,632

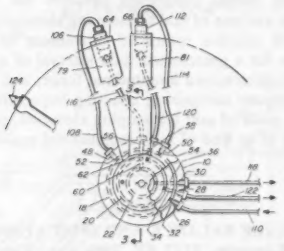
PNEUMATIC TRANSFER SWITCH FOR BATCH WEIGHING

Vergil M. Moye, Dublin, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 24, 1976, Ser. No. 699,569

Int. Cl.² G01G *19/22, 13/02*

U.S. Cl. 177—70 **5 Claims**



1. A pneumatic transfer switch for variably setting and automatically controlling cut-off weight points on a scale for material being measured in a batching operation which comprises:

a stationary disc having a ground forward face, a rear face and a peripheral edge, said forward face having a plurality of annular axially positioned grooves therein and a centrally disposed axially aligned shaft clearance hole therethrough, said rear face of said stationary disc being fixedly attached to a housing member of said scale, said peripheral edge having a plurality of radially positioned output connection threaded bores therein and an input threaded connection bore, said connection threaded bores communicating with said annular grooves through L-shaped drilled air passageways, said output connection threaded bores providing connections for a pneumatic air supply and for a plurality of pneumatic output signals;

pneumatic sensor means for detecting the interruption of an air stream and for generating pneumatic output signals in response thereto;

rotating pneumatic means, axially aligned and biasedly held in slidable contact with said stationary disc, for respositioning said sensor means with respect to said cut-off weight points on said scale and for maintaining a continuous pneumatic supply flow to said sensor means, and for carrying pneumatic output signals from said sensor means to said stationary disc to control said batching operation;

rigid pneumatic lines pneumatically connected intermediate said sensor means and said rotating pneumatic means; and

pneumatic lubricating material operatively disposed intermediate said rotating pneumatic means and the ground forward face of said stationary disc, said lubricating material providing pneumatic sealing between said rotating pneumatic means and said staionary disc means.

4,023,633

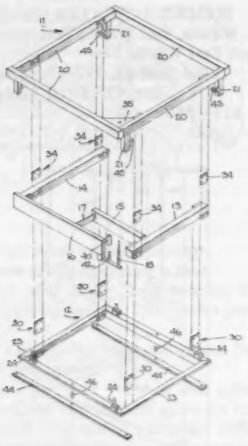
FLEXURE SCALE

Burt L. Swersey, 152 Edgemont Road, Scarsdale, N.Y. 10583, and Peter I. Fried, 61 Old Knollwood Road, White Plains, N.Y. 10607

Filed Dec. 22, 1975, Ser. No. 642,793

Int. Cl.² G01G *19/52, 21/08*

U.S. Cl. 177—144 **20 Claims**



1. A scale comprising

a support frame;

a load frame disposed on said support frame for receiving a load;

a pair of displacement transmitting members disposed on opposite sides of said support frame;

a plurality of load flexures connecting said load frame to each of said members to transfer the weight of a load thereto;

a plurality of support flexures connecting each said member to said support frame to permit each member to pivot under an applied weight of a load on said load frame;

a first beam arm secured to one of said members to pivot therewith and extending towards the other of said members;

a second beam arm secured to the other of said members;

a transfer arm secured to said second beam arm and to said first beam arm to transfer the load of said second beam arm to said first beam arm;

means disposed between said support frame and said first

beam arm to proportionately restrain movement of said first beam arm relative to said support frame; and

a sensing means mounted on said support frame near one corner for emitting a signal corresponding to the displacement of said first beam arm relative to said support frame as a measure of the magnitude of a load on said load frame.

4,023,634

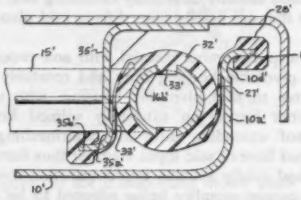
PLATFORM TYPE WEIGHING SCALE

Mike A. Provi, and S. Robert Guinter, both of Rockford, Ill., assignors to The Brearley Company, Rockford, Ill.

Filed Nov. 12, 1975, Ser. No. 631,330

Int. Cl.[2] **G01G** *21/02, 3/14*

U.S. Cl. 177—211 **8 Claims**



1. In a platform type weighing scale including a base and a scale platform, first and second rigid torque members disposed between the base and platform, first and second pairs of hub members respectively nonrotatably attached to the ends of the first and second torque members, the hub members each having a flexible base suspension member and a flexible platform suspension member formed integrally therewith at spaced locations therearound, means attaching the free ends of said flexible base suspension members to said base to pivotally suspend the torque members from the base and means for attaching the free ends of said flexible platform suspension members to said platform to suspend the platform from the torque members and apply turning moments to the first and second torque members correlative with the load applied to the platform, and weight indicating means connected to the first and second torque members for sensing the turning moments applied thereto.

4,023,635

SNOWMOBILE TORQUE CONVERTER CONSTRUCTION AND ARRANGEMENT

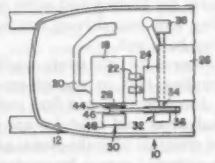
Richard Donald Teal, Horicon, Wis., assignor to Deere & Company, Moline, Ill.

Continuation-in-part of Ser. No. 543,013, Jan. 21, 1975, Pat. No. 3,967,509. This application Feb. 17, 1976, Ser. No. 658,517

The portion of the term of this patent subsequent to July 6, 1993, has been disclaimed.

Int. Cl.[2] **B62M** *27/02, 9/08;* **F16H** *55/52*

U.S. Cl. 180—5 R **4 Claims**



1. In a snowmobile including an engine having a straight crankshaft portion extending from one side thereof and drivingly connected to an endless traction belt by a transmission including a torque converter defined by variable speed primary and secondary pulleys respectively mounted on the crankshaft portion and a shaft extending parallel to the crankshaft portion and interconnected by a drive belt, and the primary pulley having an axially fixed pulley half located adjacent to and inboard of an axially shiftable pulley half which forms part of a housing adapted to contain a speed sensitive mechanism, the improvement comprising: said secondary pulley having an axially shiftable pulley half located adjacent to and inboard of an axially fixed pulley half and having an axially shiftable abutment member located adjacent to and outboard of the axially fixed pulley half; connecting means joining the shiftable pulley half with the abutment member; biasing means interposed between the fixed pulley half and the abutment member for urging the abutment member away from the fixed pulley half; and said fixed pulley half and abutment member having cooperating surface means forming part of torque sensitive means acting to transform a component of the torque into an axial thrust which increases in a direction tending to separate the abutment member and fixed pulley half as the torque resistance of the shaft increases.

4,023,636

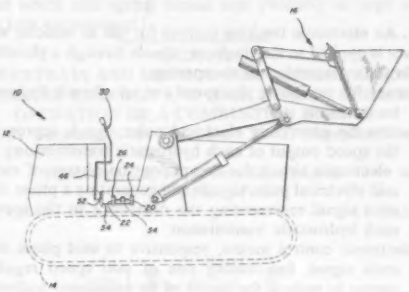
SINGLE LEVER CONTROL UNIT FOR HYDROSTATIC TRANSMISSION

Daniel R. Levin, Coralville,, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Oct. 1, 1975, Ser. No. 618,445

Int. Cl.[2] **B62D** *11/02*

U.S. Cl. 180—6.48 **3 Claims**



1. In a vehicle having an elongated frame with first and second driven members on opposite sides of said frame; first and second variable displacement, reversible hydraulic means respectively connected to said driven members for driving said members at varying speeds in opposite directions, each of said hydraulic means including a pivoted control arm pivoted about a pivot axis in opposite directions from a neutral position; a single control lever for moving said control arms; mounting means mounting said control lever for pivotal movement about a first pivot axis extending parallel to the pivot axes for said control arms and a second pivot axis extending perpendicular to said first pivot axis, said mounting means including a block supporting said lever, a bar fixed to said block at a location spaced from said first pivot axis and extending parallel to said first pivot axis, and rigid link means respectively connecting opposite ends of said bar to respective control arms so that movement of said lever about said first pivot axis will move both control arms in one direction to control the forward and reverse speed of said vehicle and movement of said lever about said second pivot axis will move said control arms in opposite directions to control the direction of said vehicle, the improvement comprising a plate secured directly to said block with said plate and block being pivoted as a unit with said lever about said first pivot axis, and releasable latch means cooperating with said plate for holding said plate, block and lever in an adjusted position with respect

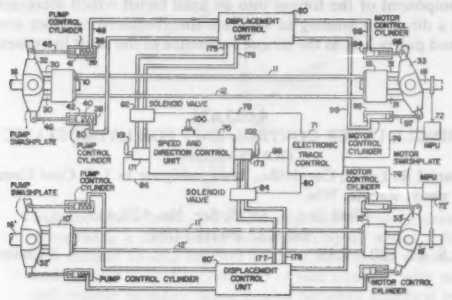
to said first pivot axis while accommodating movement of said lever about said second pivot axis, said latch means including an electrically operated solenoid having a plunger movable between first and second positions, a friction pad secured to a free end of said plunger and movable therewith so that said pad is forced into engagement with said plate when said plunger is moved from said first to said second position.

4,023,637

PROGRAMMABLE ELECTRONIC TRACKING CONTROL FOR VEHICLES WITH HYDROSTATIC TRANSMISSIONS

Melvin Claude Jackovich, Stillman Valley, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 3, 1975, Ser. No. 626,157
Int. Cl.² B62D *11/04*; F15B *18/00*
U.S. Cl. 180—6.48 **42 Claims**



1. An electronic tracking control for use in vehicles where power is applied to the tracks or wheels through a plurality of hydrostatic transmissions comprising:

means for regulating the speed output of each hydrostatic transmission;

means for generating electrical pulse signals representing the speed output of each hydrostatic transmission;

an electronic circuit for comparing the phases of each of said electrical pulse signals and generating a phase difference signal representing the difference in the speed of each hydrostatic transmission;

electronic control means, responsive to said phase difference signal, for causing one of said speed regulating means to reduce the speed of its associated hydrostatic tranmission thereby facilitating operation of the vehicle in a desired path of operation.

4,023,638

DRIVE LINE DISCONNECT MECHANISM

Donald E. Holmes, Clark Lake; Wayne R. Howard, Jackson; John F. Fisher, Jackson, and Burton S. Zeller, Jackson, all of Mich., assignors to Clark Equipment Company, Buchanan, Mich.

Filed May 24, 1976, Ser. No. 689,227
Int. Cl.² B60D *1/08*
U.S. Cl. 180—14 B **14 Claims**

1. In a modular vehicle which is separable into a power module having drive means as well as drivable wheels and a work module having drivable wheels, said modules being adapted to be joined together via confronting opposed coupling members attached to said power and work modules, respectively, a drive line disconnect mechanism comprising:

a. a first toothed coupling half rotatably mounted in a midmount bearing box attached to said power module coupling member, with one end of said first coupling half being adapted to be drivably connected with said power module drive means; and

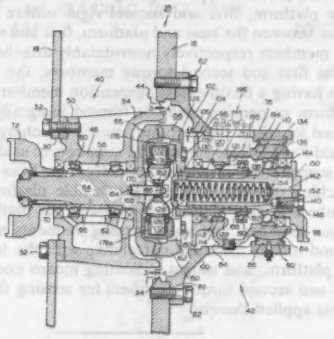
b. a second toothed coupling half rotatably mounted in a disconnect assembly attached to said work module coupling member, said disconnect assembly including:

1. a support housing attached to said work module coupling member and having a central bore;

2. a pivotable housing coaxial with and received within said support housing bore and pivotally connected with said support housing in a manner so as to permit a predetermined first amount of multi-planar pivotal movement of the distal end of said pivotable housing relative to the bore of said support housing with said pivotable housing having a central bore;

3. an input member coaxial with said pivotable housing and having a hollow shaft with a longitudinally splined bore closed on one end, with an open end portion of said hollow shaft extending into said pivotable housing central bore and being rotatably journalled as well as axially slidably mounted relative thereto, with the closed end portion of said input member merging into opposed radially outwardly extending first flange portions that are axially spaced from said pivotable housing;

4. an output member coaxial with and received within said pivotable housing bore and rotatably journalled relative to said pivotable housing, with said output member having an externally splined bore portion thereof extending into and intermeshing with the splined bore of said input member thus forming a driving and axially slidable interconnection therebetween, said output member being adapted to be operatively



connected with the drivable wheels of said work module;

5. said second toothed coupling half being concentric with said input member, said second coupling half having opposed radially inwardly extending second flange portions adjacent to said first flange portions, said second flange portions being connected with said first flange portions via a universal joint assembly, thereby permitting a limited second amount of multi-planar pivotal movement of said second coupling half with respect to said input member;

6. means for centering said second coupling half relative to said first coupling half;

7. biasing means for biasing said input member and second coupling half into driving engagement with said first coupling half; and

8. disconnect means for selectively axially displacing said second coupling half in opposition to said biasing means for disconnecting said first and second toothed coupling halves as said modules are joined, said first and second amounts of multi-planar pivotal movement combining with said means for centering so as to take up unavoidable misalignments between said vehicle modules as said modules are coupled and permitting initial alignment of said first and second toothed coupling halves, with subsequent actuation of said disconnect means thereafter permitting the biasing means to bias said coupling halves into driving engagement.

4,023,639
REMOTE-CONTROLLED, MOTOR-DRIVEN TRANSPORT CAR FOR TRANSPORTING MOTORS DURING ASSEMBLY

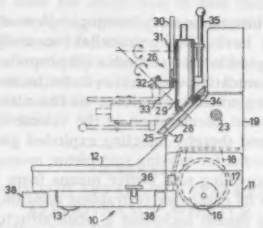
Per-Gunnar Arthur Perhed, Skovde, Sweden, assignor to AB Volvo Goteborg, Sweden

Filed July 7, 1975, Ser. No. 593,456

Claims priority, application Sweden, July 11, 1974, 7409136

Int. Cl.² B62D *61/10*

U.S. Cl. 180—21 **1 Claim**



1. A transport car for transporting motor parts or a complete motor along a path to sequential working stations and for supporting said motor parts or motor during various working operations, said transport car comprising a base frame having a main section provided with at least two wheels and a support section projecting out from said main section, said support section having a smaller width than the main section and being provided with at least one wheel adjacent its outer end, at least one of said two wheels and said one wheel being driven and at least one being steerable, and a fixture for releasably securing said motor parts or motor on said car, said fixture being mounted on the base frame and being adjustable for varying the angular position of said motor parts or motor in relation to the base frame, said fixture being mounted such that said motor parts or motor is situated at one side of the main section on the same side as the support section, said fixture comprising an attachment plate to which the rear plane of the motor block is arranged to be attached, said attachment plate being rotatable around a horizontal rotary shaft which extends parallel with the longitudinal axis of the support section, the bearing of the attachment plate being carried by an inclined rotatable index plate, the rotary axis of which lies in a vertical plane parallel with the longitudinal axis of the support section and inclines toward one side of the support section at a 45° angle.

4,023,640
WHEEL AND AXLE ASSEMBLY

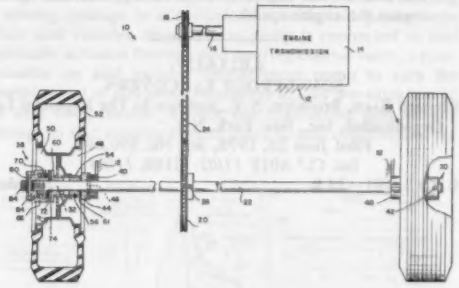
Ray D. Frazee, Shelbyville, and Charles Russell Ford, Indianapolis, both of Ind., assignors to Carlisle Corporation, Cincinnati, Ohio

Filed Sept. 2, 1975, Ser. No. 609,487

Int. Cl.² B60K *23/00*

U.S. Cl. 180—76 **3 Claims**

1. Wheel and axle assembly for a small vehicle such as a riding lawnmower including a frame and an engine mounted upon said frame, said assembly comprising an axle having opposite first and second ends, means for journal mounting said axle for rotation on said frame, means for drivingly connected said engine to said axle, first and second wheels for mounting, respectively, on said first and second axle ends, in which the improvement comprises means for rigidly connecting said first wheel to said first axle end for rotation therewith, and means for providing a torque-limited driving connection between said second wheel and said second axle end, said torque-limited connecting means permitting relative rotation between said second wheel and said axle when a predetermined torque level is exceeded, said torque-limited connecting means including a first clutch plate concentrically connected to said second wheel for rotation therewith, a second clutch plate concentrically mounted on said second axle end for rotation therewith, and spring means for yieldably urging said plates into engagement, said second wheel including a rigidly fixed sleeve, said sleeve having a pair of axially and rigidly spaced apart bearings fixed in said sleeve and journal mounted on said second axle end, one of said bearings having a radially outwardly extending peripheral flange providing



said first clutch plate, means providing a stop on said second axle end, the other of said bearings being against said stop, said second clutch plate being axially movable toward and away from said first clutch plate, said spring means being disposed to urge said second clutch plate toward said stop and against said first clutch plate, and means for providing a hub against which said spring means acts yieldably to urge said plates into engagement.

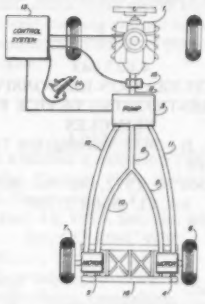
4,023,641
POWERTRAIN AND METHOD FOR ACHIEVING LOW EXHAUST EMISSION AND HIGH FUEL ECONOMY OPERATION OF A COMBUSTION ENGINE

David P. Ganoung, 4406 Chickasaw Road, Memphis, Tenn. 38117

Filed Sept. 25, 1975, Ser. No. 616,640

Int. Cl.² B60K *17/10*

U.S. Cl. 180—66 R **15 Claims**



1. A powertrain comprising:

a combustion heat driven engine having a power output shaft,

a continuously variable ratio transmission having a power input shaft coupled to said engine output shaft,

control means for controlling the ratio of said transmission,

means connected to said control means for supplying an operator input signal corresponding to the desired power output of said engine,

and means for generating a signal related to the power output of said engine and for applying said generated signal to said control means;

said control means facilitating unthrottled flow of a lean

burn and substantially constant strength air-fuel mixture to said engine for combustion, whereby fuel economy is improved and combustion exhaust gas emissions of carbon monoxide and notrogen oxides are reduced,

and said control means adjusting the ratio of said transmission in response to a difference between said operator input signal and said generated signal to establish said desired engine power output by increasing or decreasing the load on the engine to respectively, decrease or increase the engine speed.

4,023,642

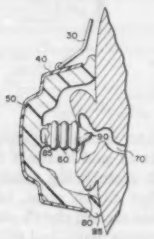
SOUNDPROOF EARCOVERS

Bernard Korn, Brooklyn, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed June 25, 1975, Ser. No. 590,094

Int. Cl.² A01F *11/02;* **G10K** *11/04*

U.S. Cl. 181—33 R **2 Claims**



1. A soundproof earcover, comprising:

an outer shell forming a cavity to cover an ear, when in contact with a head,

a flexible foam insulation deposited in the outer shell,

an ear plug mounted on the foam, thereby forming a seal for an ear canal of the user,

a strap attached to the ear cover and mounted over the head of the user,

a second ear cover attached to the distal end of the strap, thereby forming a set of earcovers, whereby all sound may be prevented from reaching the user, and

the plug forming a hollow central core and forming flexible ridges.

4,023,643

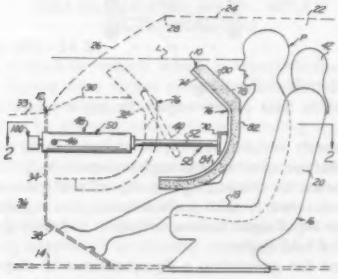
DECELERATION-RESPONSIVE PASSENGER-RESTRAINING DEVICE FOR MOTOR VEHICLES

William H. Bagley, Jr., 3032 Morningview Terrace, Birmingham, Mich. 48010

Filed Oct. 30, 1972, Ser. No. 302,214

Int. Cl.² B60R *21/08*

U.S. Cl. 180—103 A **8 Claims**



1. A deceleration-responsive passenger-restraining device for installation in a motor vehicle having a passenger compartment with a steering wheel and a passenger seat therein, said device comprising

reciprocatory fluid pressure motor means adapted to be mounted on said motor vehicle and including cylinder means and piston means therein reciprocable relatively thereto and adapted to extend into the passenger compartment,

buffer means adapted to be disposed in the passenger compartment and operatively connected to said piston means for motion thereby from a retracted position remote from the seat to a passenger-restraining position adjacent the seat,

substantially instantaneously-burning explosive gas generating means having solid propellant cartridge receiving means adapted to receive such solid propellant cartridges and communicating with said cylinder means,

cartridge-firing means responsive to the attainment of a predetermined deceleration of the vehicle for firing the cartridge and thereby injecting exploded gases into said cylinder means for moving said piston means and consequently propelling said buffer means from its retracted position to its passenger restraining position,

said buffer means including a plate structure having a substantially rigid approximately vertical intermediate plate portion and also having a substantially rigid lower plate portion disposed angularly relatively to said intermediate portion and extending therebelow toward said cylinder means,

and braking means including a braking member movable into and out of braking engagement with said piston means,

said braking means being disposed adjacent said piston means and responsive to the travel of said buffer means a predetermined distance toward said passenger-restraining position for moving said braking member into braking engagement with said piston means and halting said piston means.

4,023,644

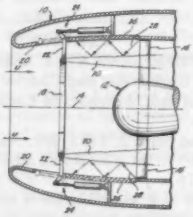
FLUID LAYER ACOUSTIC SHIELD FOR TURBOFAN JET PROPULSION ENGINE

Samuel Joseph Cowan, Seattle, and John William Little, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed July 2, 1975, Ser. No. 592,544

Int. Cl.² F02C *7/24*

U.S. Cl. 181—33 HA **21 Claims**



1. A method for suppressing noise normally propagating outwardly from within an inlet of a turbofan jet propulsion engine, said inlet having an axis and an inner wall, said method comprising the steps of:

generating a wake in the airstream traveling through said inlet, said wake having at least one of the following properties,

a. the fluid in said wake having a velocity less than the velocity of the airstream surrounding said wake, and

b. the acoustic velocity in the fluid in said wake being greater than the acoustic velocity in said airstream, said

wake being located in said inlet so as to reflect sound waves generated aft of the inlet opening, and

absorbing at least a portion of the reflected sound waves within the inlet.

15. An apparatus for suppressing noise generated by the tips of the fan blades in a turbofan jet propulsion engine, said engine including an inlet having a longitudinal axis, an inlet opening and an inner wall, comprising:

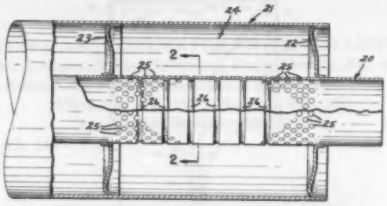
means associated with said inlet for generating a wake in the airstream traveling through said inlet, said means being so constructed and oriented within said inlet so as to form an annularly-shaped wake and so as to locate said wake inwardly from the inner wall of said inlet, radially outwardly from the longitudinal axis of said inlet, and forwardly from said fan blades, and

a layer of acoustically absorbent material, said layer being positioned adjacent said inner wall, forwardly from said fan blades, and rearwardly from said means for generating said wake.

4,023,645
METHOD AND APPARATUS FOR REDUCING AERODYNAMIC WHISTLE

Thomas J. Retka, Lakeville, and Wayne M. Wagner, Apple Valley, both of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Filed Feb. 27, 1975, Ser. No. 553,558
Int. Cl.² F01N *1/00*
U.S. Cl. 181—48 **5 Claims**



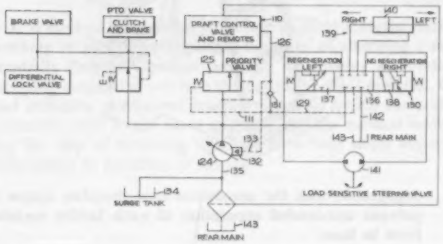
1. In a muffler having a gas flow passage communicating with a closed resonating chamber by sharp edged perforations aligned in the direction of gas flow, the improvement which comprises means preventing extended smooth flow of the gas past the perforations without materially restricting such flow, including an array of inward, transverse beads spaced along the passage having the perforations, in the direction of gas flow, the depth of said beads being of the same order of magnitude as the wall thickness of said passage.

4,023,646
LOAD SENSITIVE HYDRAULIC SYSTEM

Charles P. Heisig, and John R. Plate, both of Milwaukee, Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 24, 1975, Ser. No. 634,875
Int. Cl.² B62D *5/08*
U.S. Cl. 180—132 **10 Claims**

1. A hydraulic system including a regenerative balanced hydraulic steering circuit and auxiliary circuits operating from a variable displacement pump having a compensator sensing load pressures to control the pump displacement to meet the load requirements of the hydraulic system including, a steering control valve including, a housing, an input shaft adapted for connection to the steering wheel, a metering unit in said steering control valve for metering the flow of pressurized fluid through said control valve to provide proportionate fluid flow through the valve responsive to the angular rotational movement of said input shaft, a hydraulic actuator for connection to a steering linkage for steering a motor vehicle, said hydraulic actuator defining rod end hydraulic chamber and a base end hydraulic chamber, conduit means between said steering control valve and said hydraulic actuator to operate said steering linkage in response to fluid flow through said steering control valve, a commutator sleeve connected to said input shaft, a valve sleeve received in said valve housing and receiving said commutator sleeve defining passageways for selectively transmitting pressurized fluid through said steering valve and metering unit for regenerative operation of said hydraulic steering circuit in one direction and nonregenerative steering in the other direction, a variable displacement pump, said commutator sleeve and said valve sleeve defining a sensing passage in communication with said passageways when said variable displacement pump is connected to said hydraulic actuator through said steering control valve, a compensator on said variable displacement pump to vary the displacement of said pump responsive to load pressures sensed by said compensator, a pilot line connecting said sensing passage in said steering control valve to said compensator for



sensing a load signal for controlling the displacement of said pump responsive to load requirements in said hydraulic steering circuit, auxiliary circuits including an auxiliary control valve for controlling the flow to fluid to hydraulic actuators in said auxiliary circuits, a priority control valve connected to the output of said variable displacement pump to provide priority of flow to said steering circuit, an auxiliary pilot line sensing load requirement in said auxiliary circuit connected to said compensator to vary the displacement of said pump responsive to load demands in said auxiliary circuit, conduit means connecting said pilot line connected to said steering control valve to said priority valve for controlling the priority flow to said steering circuit responsive to load requirements in said steering circuit, check valve means connecting said pilot line connected to said steering control valve to said auxiliary pilot line and preventing auxiliary load pressures from controlling the priority valve.

4,023,647
FREESTANDING LADDER STRUCTURE

Raymond C. Confer, Gasport, N.Y., assignor to Confer Plastics, Inc., North Tonawanda, N.Y.

Filed Dec. 18, 1975, Ser. No. 642,122
Int. Cl.² E06C *9/00*
U.S. Cl. 182—108 **8 Claims**

1. A freestanding ladder structure adapted to rest on a support to bridge an object, comprising:

a platform adapted to be positioned above said object;

a first ladder member arranged on one side of said object and having a lower end portion and having an upper end portion supportively engaging said platform;

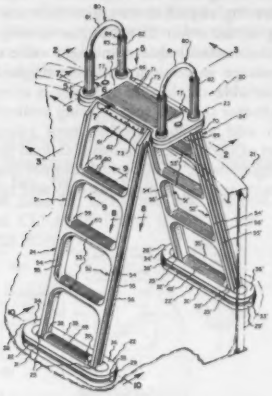
a second ladder member arranged on the opposite side of said object and having a lower end portion and having an upper end portion supportively engaging said platform, the side-pieces of said first and second ladder members being hollow tubular members;

a reinforcing insert positioned within each of said side-pieces to resist flexure thereof;

a first base member operatively arranged between said first ladder member lower end portion and said support; and

a second base member operatively arranged between said

second ladder member lower end portion and support, each of said base members being provided with a recess adapted to receive the lower end portion of the associated ladder member, each of said ladder member lower end portions being provided with at least one hook member



engageable with the associated base member recess to prevent unintended separation of each ladder member from its base;

whereby a person may traverse said ladder structure to cross said object.

4,023,648

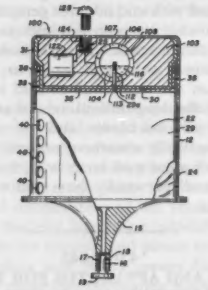
LUBRICANT APPLICATORS

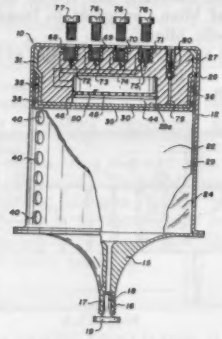
Anton Orlitzky, 5291 -6th Ave., Delta, British Columbia; Colin W. Oloman, 4573 W. 2nd Ave., and Helmut E. Fandrich, 6411 Cambie St., both of Vancouver, British Columbia, all of Canada

Filed May 9, 1974, Ser. No. 468,221
Int. Cl.² F16N *11/10*
U.S. Cl. 184—39 **25 Claims**

1. Apparatus for constantly supplying lubricant to a bearing, comprising a container having an outlet in an end thereof and adapted to be connected to a lubricating system, a separator movably mounted in the container spaced from and movable towards said outlet and dividing said container into a lubricant chamber on the outlet side thereof and a gas chamber on its opposite side, said separator including means for preventing gas from moving from the gas chamber into the lubricant chamber, electrical current and gas generating means in the container and in communication with the gas chamber, said current and gas generating means including a cell having therein a cathode separated from an anode, an electrolyte confined within the cell and at all times in contact with the cathode and the anode, means in the cell preventing the flow of electrolyte from the cell while permitting gas to flow therefrom to the gas chamber, an electrical circuit, in the container external of the cell, for connecting said cathode to said anode, switch means, located in the circuit between said cathode and said anode, for, when activated, closing said circuit to cause electrical current flow through said electrolyte and the consequent generation of gas which flows into the gas chamber and against the separator to move said separator against lubricant in the lubricant chamber to force said lubricant out through the outlet.

20. Apparatus for constantly supplying lubricant to a bearing, comprising a container having an outlet in an end thereof and adapted to be connected to the lubricating system of a bearing, a diaphragm, disposed near an end of the container remote from said outlet, which is expandible to force lubricant in the container out through said outlet, a soherical gas chamber in the container behind the diaphragm, said chamber comprising a cathode and an anode arranged around a central axis and formed by interleaved segments separated from each other by insulating means therebetween, an electrical circuit connected at one end to the cathode segments and at an opposite end to the anode segments a battery connected in said circuit, an electrolyte in the chamber in continuous contact at all times with said anode and said cathode, switch





means for, when activated, completing said electrical circuit through said electrolyte so that a gas is generated by said electrolyte and a gas passage extending from above the electrolyte in the chamber out of said chamber for directing generated gas against the diaphragm to force lubricant out through said outlet.

4,023,649

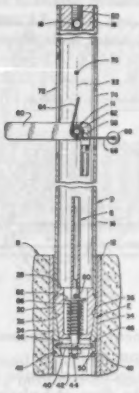
SAFETY LOCK DEVICE FOR LIFTS

Ralph R. Wood, Florissant, Mo., assignor to Wyle Laboratories, El Segundo, Calif.

Filed Oct. 3, 1975, Ser. No. 619,205
Int. Cl.² B66F *7/28*
U.S. Cl. 187—8.49 **10 Claims**

4. A safety lock device for lifts or the like comprising; an elongated inner member received within an outer member for extension and retraction relative thereto between fully retracted and fully extended positions, brake means carried by said inner member within said outer member for locking said inner member against retraction movement from substantially any extended position thereof beyond said fully retracted position, releasing means for releasing said brake means and being movable between brake arming and releasing positions, said releasing means being in said releasing position in said

fully retracted position of said inner member, and operating means responsive to extension movement of said inner member from said fully retracted position for moving said releasing means to said arming position.



4,023,650

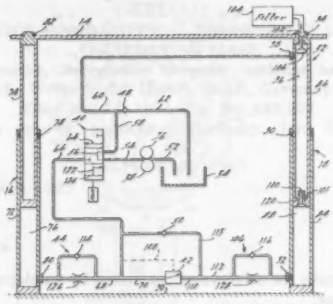
HYDRAULIC SYSTEMS FOR TWO SPEED LIFTING

Walter J. Pleier, Bristol Township, Bucks County, Pa., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 20, 1975, Ser. No. 606,034

Int. Cl.² B66B 9/20; F15B 11/16

U.S. Cl. 187—9 R **20 Claims**



9. A hydraulic system for moving a load, said system comprising:

A. a plurality of fluid motors each having a working chamber, and mechanical output member positively connected to said load;

B. means operable to supply pressurized fluid at a fixed rate to the working chambers of all of said motors to thereby move said load at a predetermined speed;

C. means for sensing the magnitude of said load and for blocking the flow of pressurized fluid to at least one of said motors when said load is less than a predetermined magnitude, thereby increasing the speed with which said load is moved; and

D. motor reservoir means operatively carried with said mechanical output member of said at least one motor means and including means operative to allow unpressurized fluid to flow from said motor reservoir means to the working chamber of said at least one motor when said load is less than said predetermined value.

4,023,651

DAMPING VIBRATIONS IN SHEET MATERIAL

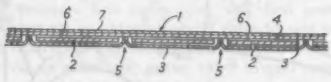
Kenneth Healiss, Melton Mowbray, England, assignor to The Production Engineering Research Association, Melton Mowbray, England

Continuation-in-part of Ser. No. 452,141, March 18, 1974, abandoned. This application Apr. 30, 1975, Ser. No. 573,098

Claims priority, application United Kingdom, Mar. 31, 1973, 15609/73; Mar. 20, 1975, 11545/75

Int. Cl.² F16F 7/08

U.S. Cl. 188—1 B **17 Claims**



1. A method of damping vibrations in sheet material during working or handling comprising the steps of attaching a substantially flexible vibration damping pad having a vibration damping material at one face thereof to the sheet material, the pad including permanent magnet means by which the pad is releasably held to the sheet material, and the method including the step of removing said pad from said sheet material subsequent to handling or storing.

4,023,652

BUMPER ARRANGEMENT FOR VEHICLES WITH AT LEAST ONE DEFORMATION TUBE

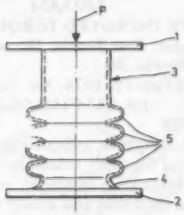
Gernot Torke, Neu-Ulm, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed May 28, 1975, Ser. No. 581,675

Claims priority, application Germany, June 4, 1974, 2426938

Int. Cl.² F16F 9/30

U.S. Cl. 188—1 C **1 Claim**



1. A shock absorbing device comprising:

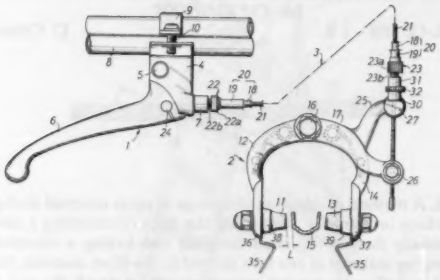
several deformable cylindrical tubes, each tube being made of a material with a strength different than the others, said tubes being connected axially in series with one another, said tubes being smooth in their initial state and at least one of said several tubes having an outwardly flaired annular flanged end; and

elements acting on the ends of said series of tubes for introducing approximately axial compressive forces to the tubes, at least one of said elements acting on the flanged end of the tube and being a flat plane plate extending at least over the cross section of the flange.

4,023,653
BRAKE ADJUSTING DEVICE FOR BICYCLES

Toshiharu Yoshigai, Higashi-Osaka, Japan, assignor to Yoshigai Kikai Kinzoku Co., Ltd., Japan

Filed Dec. 8, 1975, Ser. No. 638,913
Claims priority, application Japan, Aug. 2, 1975, 50-94416
Int. Cl.² B62L 3/02; F16C 1/22
U.S. Cl. 188—24 4 Claims



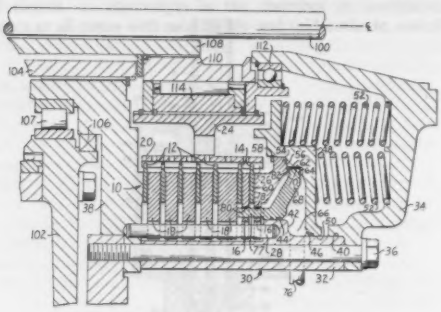
1. In a brake system for a bicycle comprising brake means including brake shoes movable into or out of contact with the rim of a wheel to brake the wheel, and a bowden cable including an inner element and an outer element interconnecting the brake means and a brake operating lever to transmit a grasping force on the lever in a direction to actuate the brake means, a brake adjusting device comprising adjusting means provided at least at one end of the bowden cable, the adjusting means including a gauge member having a bore for passing the inner element therethrough and a non-circular hole, including side portions, formed at one end of the bored portion and having a depth equal to a proper brake clearance, a nut having a portion shaped to fit in the hole of the gauge member only when aligned therewith and to positively engage the side portions thereof to prevent any rotation of the nut relative to the guage member, and an adjusting screw member screwed in the nut and connected to the outer element, wherein the adjusting screw member is movable on the nut, in screw-thread engagement therewith, until the ends of the brake shoes come into contact with the rim while the nut is not aligned with the hole of the gauge member, and the nut is fittable into the hole of the gauge member after the shoes contact the rim to thereby provide the proper brake clearance.

4,023,654
BRAKE WITH IMPROVED TORQUE MODULATION

James E. Winzeler, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 19, 1976, Ser. No. 733,975
Int. Cl.² F16D 65/24
U.S. Cl. 188—170 5 Claims

1. A brake construction, comprising:
first and second relatively rotatable structures;
a plurality of brake discs carried by one of said structures to be rotatable therewith and axially movable thereon;
a plurality of reaction plates carried by the other of said structures to be rotatable therewith and axially movable thereon;
the discs and the plates being interleaved in alternating fashion to define a pack;
an axially movable primary piston adapted for engagement with said pack;
spring means carried by said other structure for biasing said primary piston toward said pack;
an expandable chamber in said other structure and including said primary piston, said chamber being arranged so that when fluid under pressure is directed thereto, said piston will buck said spring means;
an axially movable secondary piston forming part of said chamber and in bucking relation to said primary piston;
said primary piston having a larger surface area facing the interior of said chamber than said secondary piston;

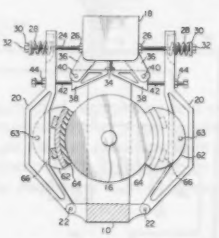


means limiting movement of said secondary piston relative to said primary piston; and
means coupled to said secondary piston for applying a force to less than all of the discs and plates in said pack, said force in concert with said spring means.

4,023,655
BRAKE FOR ELEVATOR

Nobuo Anzai, and Takao Kato, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 21, 1975, Ser. No. 634,269
Int. Cl.² F16D 65/06
U.S. Cl. 188—171 4 Claims

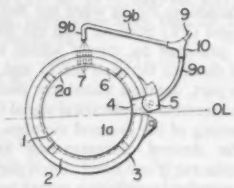


1. A brake for an elevator car driven by an electric motor comprising;
a brake drum connected, in use, to the electric motor to be rotated thereby;
a pair of brake shoes disposed diametrically on opposite sides of said brake drum and movable toward and away from said brake drum, each of said brake shoes having a brake lining secured on a surface thereof facing said brake drum;
biasing means for continuously biasing said brake shoes toward said brake drum for applying a braking force thereto;
moving means, including an electromagnet for moving said brake shoes away from said brake drum against the action of said biasing means when the electric motor is energized and for allowing said brake shoes to be moved toward said brake drum by the action of said biasing means when the electric motor is deenergized; and
heating means, for heating said brake lining to a temperature sufficient to remove moisture therefrom, whereby the coefficient of friction between said brake lining and said brake drum is maintained substantially constant.

4,023,656
WET TYPE BAND BRAKE APPARATUS

Toshikazu Kuwahara, Tsuzuki; Ryokichi Nishida, Hirakata, and Kenji Kumagae, Tsuzuki, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 12, 1975, Ser. No. 640,279
Claims priority, application Japan, Feb. 4, 1975, 50-015616
Int. Cl.² F16D 65/80
U.S. Cl. 188—264 B 3 Claims

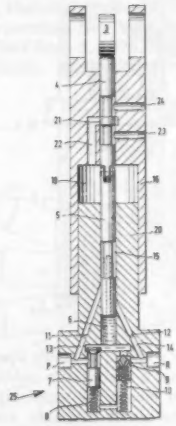


1. A wet type band brake apparatus comprising a brake drum, a brake lining mounted on the periphery of said brake drum, said brake lining having a groove along the entire circumference of the contact surface thereof and a hole passing through said lining into said groove to introduce oil therethrough, a brake band mounted on the periphery of said brake lining, said brake band having a hole therein aligned with the hole in said brake lining to introduce oil therethrough, an inlet port for oil positioned at a discontinuous portion of said brake lining and said brake band and, means for introducing oil into said hole in said brake band and said inlet port whereby oil flows through said hole in said brake lining, into said groove and then onto the contact surface of said brake lining thereby cooling friction heat caused by braking action.

4,023,657
DEVICE FOR DAMPING A PERPENDICULARLY OSCILLATING MASS

Peter Trzoska, Bodenheim, Germany, assignor to Feinmechanische Werke Mainz GmbH, Mainz, Germany

Filed Jan. 14, 1976, Ser. No. 649,027
Claims priority, application Germany, Jan. 23, 1975, 2502627
Int. Cl.² F16F 9/348
U.S. Cl. 188—283 3 Claims



1. A device arranged to be connected to a hydraulic pump and reservior for damping a primary mass vertically oscillating relative to a base comprising:

a vertically oscillatory constant reference mass,

a first piston and a first cylinder means together defining a first pressure fluid chamber, said first piston supporting said reference mass such that the pressure in said first pressure fluid chamber is responsive to the acceleration of said reference mass,

a hydraulic means for moving the primary mass vertically relative to the base comprising a second piston and follow-up cylinder one of which is connected to the primary mass and the other of which is connected to the base, said second piston or follow-up cylinder together defining a second pressure chamber,

a first pressure line connecting said first pressure fluid chamber via an automatic inlet valve to said pump and a first return line connecting said first pressure fluid chamber via an automatic outlet valve to said reservoir, said automatic inlet and outlet valves comprising means responsive to the pressure in the first pressure fluid chamber for directing fluid into or out of the chamber at a rate related to said pressure and to move the first piston relative to the first cylinder,

a second pressure line connected to said pump and a second return line connected to said reservior,

a third piston defining the closure element of a shuttle valve which is selective of said second pressure line and second return line for directing fluid into or out of the second pressure chamber to move the second piston and follow-up cylinder relative to each other,

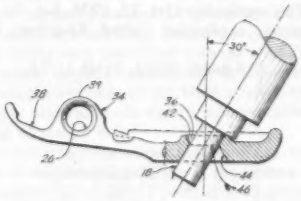
means connecting the first piston and the third piston,

such that upon vertical acceleration of the base the inertial force upon the reference mass is translated into motion of the first and third pistons thereby adjusting the volume of the second pressure chamber to change the relationship between the base and the primary mass in a way to reduce vertical movement of the primary mass.

4,023,658
DETACHABLE WEAR PAD FOR THE THIRD RAIL SHOE ON AN ELECTRIC RAILWAY CAR

Raymond H. Sierk, Whitestone, N.Y., assignor to Abex Corporation, New York, N.Y.

Filed Mar. 17, 1976, Ser. No. 667,663
Int. Cl.² B60L 5/30
U.S. Cl. 191—49 5 Claims

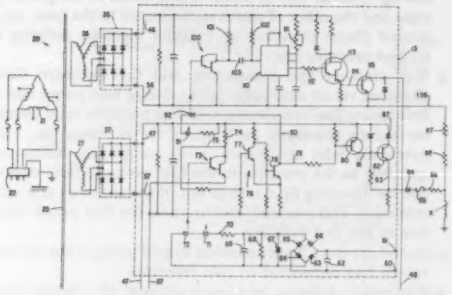


1. An electrically conductive wear pad for a third rail shoe having an opening therethrough for loosely receiving a shop transfer electrode plug which is connected to an inclined overhead trolley cable, thereby enabling a car to be walked through the shop, said pad adjacent one end thereof having attaching means enabling the pad to be detachably supported by a fulcrum member, said opening being located outboard of said attaching means, and said opening having an axis tipped substantially in the outboard direction whereby the electrode plug fitted therein is tipped with its axis substantially parallel to the inclination of the cable.

4,023,659
DUAL VOLTAGE ELECTRO-MECHANICAL CLUTCH BRAKE CONTROL SYSTEM

Bruce Edward Arnold, Clinton, N.J., assignor to The Singer Company, New York, N.Y.

Filed Oct. 3, 1975, Ser. No. 619,435
Int. Cl.² F16D *67/06*
U.S. Cl. 192—12 D **5 Claims**

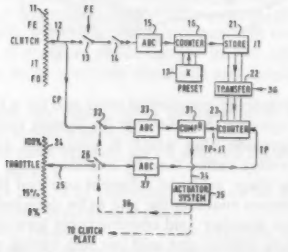


1. A dual voltage power supply control for at least one of the solenoid coils of an electro-magnetic clutch brake regulated power transmitter comprising; means for providing separate high and low DC voltage power supplies, a low voltage power transistor arranged in a low voltage control circuit with said low DC voltage power supply for influencing a low voltage output to said solenoid coil, means for selectively applying a transmitter operating signal to said power supply control, means effective during application of said operating signal for influencing said low voltage control circuit to apply a continuous drive current to said low voltage power transistor, a high voltage power transistor arranged in a high voltage control circuit with said high DC voltage power supply for influencing a high voltage output to said solenoid coil, and means effective in response to each application of said power transmitter operating signal for initiating a drive current pulse of predetermined time duration to said high voltage power transistor, said drive current pulse applied to the high voltage power transistor being generated by an electronic timing assembly which is subjected only to the electrical potential imposed by said low voltage power supply.

4,023,660
FOLLOW-UP SERVO SYSTEMS FOR CLUTCHES

Harvey Frank Dickinson, Bramhall, England, assignor to Ferranti, Limited, Hollinwood, England

Continuation-in-part of Ser. No. 509,260, Sept. 25, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,087
Claims priority, application United Kingdom, Sept. 29, 1973, 45646/73
Int. Cl.² B60K *29/02;* **F16D** *13/75*
U.S. Cl. 192—.075 **9 Claims**

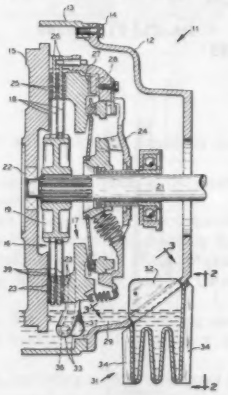


1. A follow-up servo system for controlling by means of an actuator system, and in response to signals from a demand member, the location of an axially displaceable part of a mechanical friction clutch with respect to the co-operating axially fixed part of the clutch, includes measurement transducer means for deriving a signal to represent the actual instantaneous axial location of the displaceable part in relation to a reference point, means for supplying a signal to represent the axial location of the displaceable part in relation to the reference point when the displaceable part is in its instantaneous just-touching (JT) position with the fixed part, by combining in the appropriate manner a signal from the measurement transducer means when the displaceable part is in its fully-engaged (FE) position with the fixed part, and a constant signal provided by means within the system and representing the distance between the JT and FE positions of the displaceable part, demand transducer means for deriving from the demand member an electrical signal representing the instantaneous setting of the demand member, this signal also representing the desired instantaneous axial separation between the displaceable and fixed clutch parts as demanded by the demand member, summation means responsive to and combining both the signal representing the JT position of the displaceable clutch part and the signal representing the desired instantaneous axial separation between the displaceable and fixed clutch parts, and so deriving the required instantaneous axial location of the displaceable part in relation to the reference point, comparator means for comparing the signals representing the required and the actual instantaneous axial location of the displaceable part in relation to the reference point and, in response to the detection of any difference therebetween other than a predetermined value, to provide an error signal indicative of the difference, and connections for applying the error signal to the actuator system to bring about a movement of the displaceable clutch part in the direction for nulling the signal error.

4,023,661
COOLING SYSTEM FOR A VEHICLE CLUTCH

Richard A. Flotow, Fort Wayne, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Nov. 10, 1975, Ser. No. 630,319
Int. Cl.² F16D *13/72*
U.S. Cl. 192—113 B **7 Claims**



1. A cooling system for a clutch assembly comprising a disc assembly, a pressure plate, a source of a cooling fluid and a cooling fluid distribution means for supplying said cooling fluid to the interior of the clutch assembly, said distribution means including at least a pair of pickup tubes formed on the periphery of said pressure plate, each of said pickup tubes defining an inlet opening connected in fluid communication with the interior of the clutch assembly by a fluid passageway

and wherein said inlet opening of each of said pickup tubes is offset with respect to the path of travel and said inlet opening of the other one of said pickup tubes.

4,023,662

ARRANGEMENT FOR ADJUSTING THE SPACING BETWEEN A PRINT HEAD AND A PLATEN

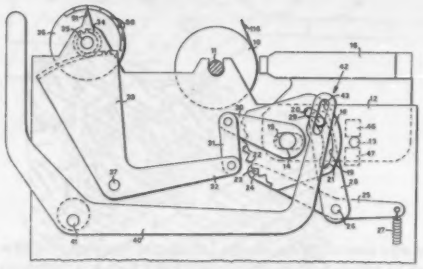
Vincenzo Perucca, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Oct. 30, 1975, Ser. No. 627,263

Claims priority, application Italy, Dec. 20, 1974, 70705/74; Dec. 19, 1974, 70681/74

Int. Cl.² B41J *3/50*

U.S. Cl. 197—1 R **7 Claims**



1. In an office machine having a platen, a wire-type printing head movable parallel to the platen along at least one guide, a manually operable means for adjusting the distance between said head and the platen comprising:

a shaft parallel to said guide, said guide engaging said head and being laterally movable along with said head toward and away from said platen,

a cam fixed to said shaft and having a cam surface,

a manually operated linkage connected to said cam for moving said cam about the axis of said shaft, and

means engageable by said surface to shift said cam and said shaft laterally when said cam is moved about said shaft axis.

4,023,663

MATRIX PRINTER COMPRISING LUBRICATED PRINTING WIRES

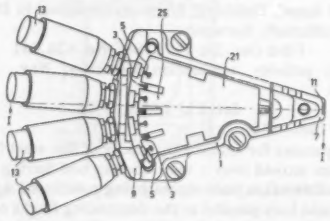
Peter Engler, Huttental-Weidenau, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 5, 1975, Ser. No. 610,569

Claims priority, application Germany, Sept. 10, 1974, 2443239

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R **6 Claims**



1. A matrix printer comprising a plurality of printing wires, journal means for guiding said wires in a fanned arrangement, and a lubricant absorbing member for providing lubricant to said wires, wherein said lubricant absorbing member comprises a strip of absorbent material having tag portions, each tag having an opening therethrough, each printing wire passing through at least one respective tag opening, said tags being arranged so that the printing wire guided therethrough is in pressure contact with an edge of the opening.

4,023,664

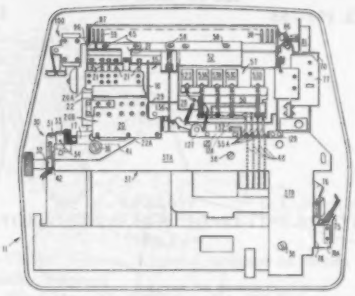
AUTOMATIC TYPEWRITER

Mariano Baffo, Woburn, and William F. Brine, Jr., Melrose, both of Mass., assignors to Ty-Data, Inc., Nashua, N.H.

Filed June 4, 1975, Ser. No. 583,678

Int. Cl.² B41J *5/30, 29/00*

U.S. Cl. 197—19 **23 Claims**



1. Apparatus for converting a code responsive, bail operated, electric typewriter for use as an automatic typewriter, the typewriter prior to its conversion including a typewriter mechanism, a frame supporting the mechanism and a case enclosing the mechanism, the typewriter mechanism including a rotatable platen, a unitary printing head, character keys and function keys, a plurality of latch interposers spaced side-by-side in the mechanism and movable in response to actuation of one of the character or function keys and means coupled to the latch interposers for operating the printing head and the platen in response to coded combinations of latch interposer movements, the mechanism defining a plurality of separate cavities, said conversion apparatus comprising:

A. a first integrally connected group of sensing switches, each of said sensing switches including means for engaging one of the latch interposers associated with the character keys without direct physical attachment thereto and means for developing output electrical code signals in response to movement of the latch interposer as a result of actuation of the character keys;

B. a first integrally connected group of actuators, each of said actuators including means for engaging one of the latch interposers associated with the character keys without direct physical attachment thereto and means for initiating movement of the latch interposers in response to input electrical code signals representative of actuation of the character keys;

C. a second integrally connected group of sensing switches, each of said sensing switches in the second group including means for engaging a portion of the printing head and platen operating means without direct physical attachment thereto and means for developing output electrical code signals in response to movement of the printing head and platen operating means as a result of actuation of the function keys;

D. a second integrally connected group of actuators, each of said actuators in the second group including means for engaging one of the latch interposers associated with the function keys without direct physical attachment thereto and means for initiating movement of the latch interposer in response to input electrical code signals representative of actuation of the function keys; and

E. at least first and second separate means for mounting said first and second groups of sensing switches and actuators within selected ones of the cavities defined by the typewriter mechanism so that the overall profile of the typewriter mechanism does not change and so that the case which encloses the mechanism also encloses said mounting means and said first and second groups of sensing switches and actuators.

4,023,665

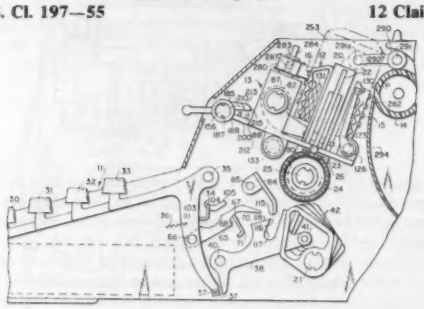
POWER DRIVEN TYPEWRITER

Robert E. Boyden, 5040 Sereno Drive, Temple City, Calif. 91006

Continuation of Ser. No. 773,145, Nov. 4, 1968, abandoned. This application May 19, 1975, Ser. No. 578,986

Int. Cl.² B41J *1/32*

U.S. Cl. 197—55 **12 Claims**



1. A typewriter comprising:

a type member having a plurality of type characters thereon,

selectively operable type character selection devices,

power means including a first cyclically operable clutch controlled by any of said selecting devices for moving said type member to present a corresponding one of said type characters at a printing location and for causing an imprint of said last mentioned type character,

power means including a second cyclically operable clutch for spacing said type member from one type character printing position to another,

and a reversible drive unit driven by said second clutch,

means operable by said first clutch for causing engagement of said second clutch,

means normally causing said drive unit to space said type member in one direction upon engagement of said second clutch,

a depressible control key,

means responsive to depression of said control key for setting said drive unit to space said type member in the opposite direction, and

means reponsive to comprising: of said control key for causing engagement of said second clutch.

4,023,666

HIGH SPEED BOTTLE TRANSFER MACHINE

James H. Rogers, Lebanon Junction, Ky., assignor to Mac Manufacturing Company, Lebanon Junction, Ky.

Continuation-in-part of Ser. No. 498,995, Aug. 20, 1974, Pat. No. 3,952,855. This application Mar. 9, 1976, Ser. No. 665,232

The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.² B65G *47/68*

U.S. Cl. 198—449 **6 Claims**

1. A machine for feeding groups of articles in one-by-one fashion, onto an outlet conveyor, which comprises in combination:

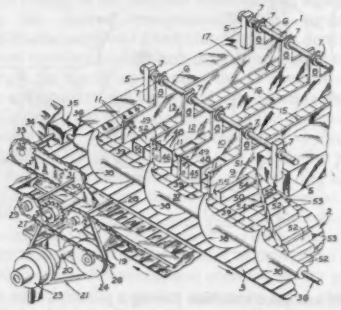
A. a longitudinal feed conveyor, located at right angles to said outlet conveyor for receiving groups of said articles and moving same toward said outlet conveyor;

B. channel means comprising a plurality of channel members disposed above said feed conveyor and extending substantially to said outlet conveyor for orienting said articles into a plurality of side-by-side rows on said feed conveyor,

1. said channel members extending along the longitudinal axis of said feed conveyor in parallel relation to each other,

C. a spacing conveyor interposed between said feed conveyor and said outlet conveyor,

1. said spacing conveyor lying adjacent and parallel to the inner edge of said outlet conveyor and normal to said feed conveyor so as to receive articles from said feed conveyor for delivery onto said outlet conveyor,



2. the direction of the conveying surface of said spacing conveyor being opposite to the direction of the conveying surface of said outlet conveyor,

D. the combination therewith of an obliquely disposed guide means on said spacing conveyor and below said channel means and moving with said spacing conveyor for simultaneously guiding, moving and pushing the articles transversely across the spacing conveyor onto said outlet conveyor in one-by-one fashion;

E. the further combination therewith of a timing screw on said outlet conveyor, said timing screw being fabricated of a polymeric material and being driven in the same direction and in synchronism with said outlet conveyor for receiving articles from said spacing conveyor in one-by-one fashion and transporting said articles along said outlet conveyor.

4,023,667

APPARATUS FOR UNSTACKING FLAT STEEL MATERIAL WHICH IS TRANSPORTED STACKED ON A RAKE COOLING BED

Manfred Appel, Duisburg, Germany, assignor to Demag Aktiengesellschaft, Germany

Filed Oct. 29, 1975, Ser. No. 626,861

Claims priority, application Germany, Nov. 30, 1974, 2456796

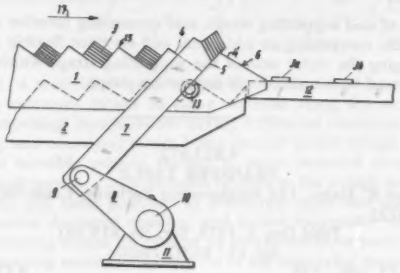
Int. Cl.² B65G *59/00*

U.S. Cl. 198—474 **1 Claim**

1. Apparatus for unstacking stacks of flat steel bars which have been moved over a rake cooling bed having stationary and movable rakes, said stacks being positioned with the flat sides of said bars parallel to the descending flanks of said rake cooling bed in the direction of movement thereof with the side edges of said bars on the ascending flanks, characterized by

a. a plurality of sliders positioned between said stationary and movable rakes transverse of said direction of movement, adjacent the last cogs of said stationary rake;

b. said sliders being mounted separately from said stationary and movable rakes;
c. said sliders having bearing surfaces for said stacks substantially parallel to the descending flanks of said last cogs;
d. movement means connected to each said slider;
e. said movement means positioned to move said plurality of sliders from a first position below said stationary rake to a second position above said stationary rake and vice versa; and
f. said movement means positioned to move said plurality of sliders parallel to the ascending flanks of said last cogs;

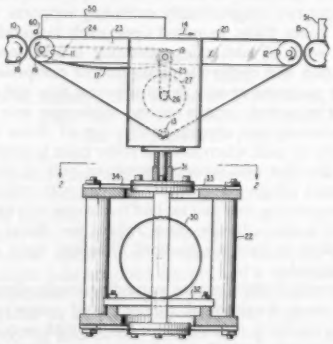


g. whereby upward movement of said slider causes upward movement of said stacks on the ascending flanks of said last cogs and the spaced delivery of each bar of said stacks down the descending flanks of said last cogs; and
h. said movement means comprises
1. a rotatable shaft positioned below and transverse to said stationary and moveable rakes;
2. a support for each said slider on said stationary rakes;
3. a hinged lever connected to each said slider;
4. the end of each said hinged lever opposite its respective slider fixed on said rotatable shaft; and
5. the speed of rotation of said shaft being adjustable.

4,023,668
IN-LINE CONTINUOUS CHECKWEIGHER

Joseph J. De Santo, Hillcrest Road, RD, Belle Mead, N.J. 08502

Filed Dec. 16, 1974, Ser. No. 532,957
Int. Cl.² B65G 69/00
U.S. Cl. 198—504 **2 Claims**

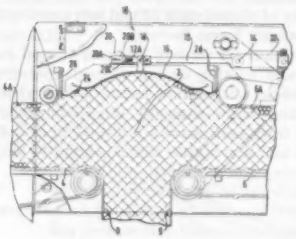


1. In a high speed check weighing system, a frame including a platform,
drive means mounted on said frame beneath said platform near the receiving end of said platform, support means carried by said frame adjacent the discharge end of said platform.
endless conveyor means being disposed over said support means and said drive means and having a horizontally disposed article-supporting portion,
a vertical support member included as part of said frame having a connecting arrangement at the bottom thereof, and
a weight sensor having a mating connector on top thereof disposed to receive said connecting arrangement for indicating the weight of the entire endless belt checkweigher as well as the commodities transported thereover, wherein said weight sensor includes a proving ring and means disposed in different horizontal planes attached to the portions of said sensor which is adopted to deflect under weight loads to eliminate all readings except those along a single load line.

4,023,669
CONVEYOR SYSTEMS FOR CIGARETTES AND THE LIKE

Peter Alec Clarke, London, England, assignor to Molins Limited, London, England

Filed Mar. 27, 1975, Ser. No. 562,396
Claims priority, application United Kingdom, Mar. 29, 1974, 13970/74
Int. Cl.² B65G 43/08
U.S. Cl. 198—573 **9 Claims**

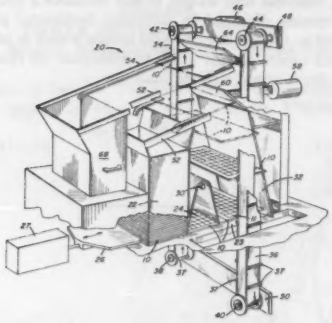


1. A conveyor system for cigarettes and similar rod-like articles, including two conveyors which extend in opposite directions from a junction zone and each of which is arranged to carry a stack of cigarettes towards or from the junction zone, and sensor means located above the junction zone for controlling the speed of one of said conveyors, said sensor means comprising an arm, support means for mounting said arm with an approximately horizontal disposition pivotally about a first horizontal axis, a plate which is pivotally connected to the arm about a second axis parallel to but remote from said first axis and which includes a portion extending from the second axis in a direction generally towards the first axis, and a portion extending from the second axis in a direction generally away from the first axis, so as to present a substantial bottom surface to rest on cigarettes in the junction zone, said plate being approximately symmetrical about a vertical plane through said second axis, the underneath surface of said plate, when viewed in the direction of the cigarette axis, being generally concave but with slightly upturned ends, and control means responsive to the position of said arm for controlling said one conveyor, said control means being connected near one end of said arm and said support means being connected near the other end of said arm, said plate being connected to said arm at a point therebetween.

4,023,670
AUTOMATIC MASTER FRAME TRANSPORT APPARATUS

Alva F. Mathes, Rochester, and Eugene Lemieux, Albion, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 14, 1976, Ser. No. 648,838
Int. Cl.² B65G 37/00
U.S. Cl. 198—604 4 Claims



1. A transport apparatus suitable for use in transporting microfiche master frames, said apparatus comprising:

means defining a loading station for storing a plurality of master frames to be transported by said apparatus;

means defining an operating station;

a pair of conveying belt members spaced apart to receive a master frame therebetween at a lifting station, said belt members adapted to be advanced in a substantially vertical direction;

a plurality of ribs on each of said belt members for supporting a master frame thereon;

feeding means for feeding first and second master frames from said loading station to said operating station in succession, said second master frame when fed to said operating station engaging and feeding said first master frame from said operating station to said lifting station where said first master frame is lifted by said ribs of said advancing belt members;

means defining an exit station;

an exit slide member for delivering a master frame from said belt members to said exit station; and

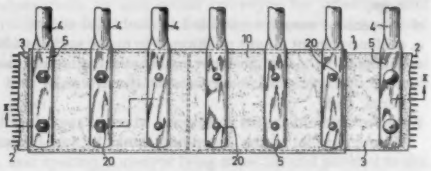
first transferring means for tranferring a master frame being lifted by said belt members from said ribs to said exit slide member which delivers the master frame to said exit station.

4,023,671
CONNECTION FOR THE ENDS OF SUPPORTING STRAPS OF AN ENDLESS BAR BELT CONVEYOR

Hans Krämer, Hannover, Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Filed Dec. 10, 1975, Ser. No. 639,390
Claims priority, application Germany, Dec. 10, 1974, 2458364
Int. Cl.² B65G 19/10
U.S. Cl. 198—728 6 Claims

1. A connection for the ends of the supporting straps of an endless bar belt conveyor, especially for agricultural machines, which includes in combination a connecting member arranged within the region of the two ends of each supporting strap and engaging the inner side of the respective supporting strap, connecting elements connecting said connecting member to the respective adjacent supporting strap, said connecting member comprising a pull-resistant flexible layer having a thickness less than the thickness of said supporting straps, additional connecting elements for connecting the bars of said bar belt conveyor to said supporting straps, the length of the connecting member being so dimensioned that it extends over the range of the connecting areas of at least two bars of both

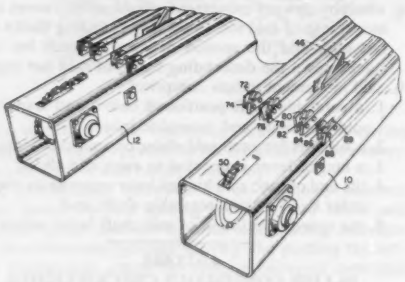


ends of said supporting straps, said connecting member additionally comprising an additional pull-resistant flexible layer engaging the outer side of the supporting straps within the region of both ends of said supporting straps.

4,023,672
TRANSFER TABLE

Ernest K. Haley, 134 Northwestern Parkway, Louisville, Ky. 40222

Filed Oct. 3, 1975, Ser. No. 619,161
Int. Cl.² B65G 19/00
U.S. Cl. 198—735 9 Claims



1. A transfer table operable for storage and lateral transfer, in a longitudinal direction, of I-beams and the like that are presented supported upon transversely and vertically extending flanges, said flanges having bottom dimensions, in the longitudinal direction, as narrow as ¼ inch, comprising:

A. at least two longitudinally extending supports; and

B. four roller trains mounted upon each longitudinal support, each of said trains extending in said longitudinal direction and each roller train further comprising a first roller mounted upon a first transverse axis and a second roller mounted upon a second transverse axis which is transversely and longitudinally spaced from said first transverse axis, wherein each roller train is positioned so that the first and second transverse axes of each roller train are staggered on ¼ inch centers with respect to the corresponding first and second transverse axis of adjacent roller trains, whereby four rollers per linear inch are provided in said longitudinal direction upon said supports; and,

C. a conveyor drive means extending longitudinally along said each longitudinal support, said conveyor means being rotatably mounted fore and aft with respect to said roller trains, such that said conveyor extends longitudinally intermediate two of said roller trains; and,

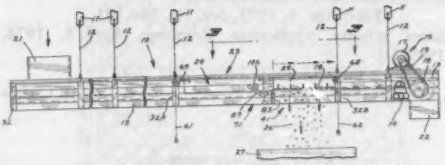
D. a dog supported upon said conveyor means operable to engage said transversely and vertically extending flanges on an I-beam and the like in order to laterally transport said I-beam upon said roller trains at a right angle, with respect to said transverse axes, and longitudinally, with respect to said longitudinal extending supports.

4,023,673

CONVEYOR DROP STRUCTURE

Glen D. Hansen, Maple Plain, Minn., assignor to Veda, Inc., Long Lake, Minn.

Filed Jan. 22, 1976, Ser. No. 651,298
Int. Cl.² B65G 47/34
U.S. Cl. 198—735 35 Claims



1. A material dropout section for a material conveyor having conveyor means to move material along the conveyor comprising: trough means having a material discharge opening, said conveying means being located in said trough means and movable relative thereto to move material along said trough means, a door movable relative to the trough means to open and close positions to selectively open and close the material discharge opening, and means engageable with the conveying means for causing up and down movements of the conveying means on movement of the conveying means relative to the trough means when the door is in its open position whereby material carried by the conveying means is discharged through the discharge opening, said means engageable with the conveying means including a first means movable to a first position in engagement with the conveying means when the door is in the open position and movable to a second position out of engagement with the conveying means when the door is in the closed position, and second means connected to the first means and cooperating with the door to move the first means to the first position when the door is in the open position and allowing the first means to move to the second position when the door is in the closed position.

4,023,674

JEWELRY BOX

Patricia A. Manley, 1230 E. Ravine Drive, Zion, Ill. 60099

Filed Nov. 14, 1975, Ser. No. 631,853
Int. Cl.² B65D 1/34, 73/00
U.S. Cl. 206—562 5 Claims

1. A jewelry box and earrings comprising, in combination:

a ceramic base having a cavity therein for holding jewelry and the like;

at least two earrings of the type that have a decorative portion made from a ceramic material, a generally straight post attached thereto and a removable clasp for cooperative attachment with the post; and,

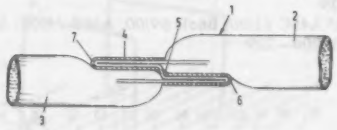
a ceramic lid adapted to cooperatively engage said base for covering said cavity, said lid having an aperture therein for receiving the post of each of said earrings, so that the decorative portion of the earrings are visually observable on the upper side of said lid, the associated clasp of each earring being secured to the portion of the associated post extending through the aperture on the underside of said lid, the upper surface of said lid being provided with fused indicia artistically associated with the shape of the decorative portion of each of said earrings.

4,023,675

PACKING FOR IMPRESSION MATERIAL FOR DENTAL USE

Antonius Bernardus Claasen, Sperwerlaan 4, Leende, Netherlands

Filed Jan. 23, 1976, Ser. No. 651,812
Claims priority, application Netherlands, Jan. 29, 1975, 7501034; June 19, 1975, 7507318
Int. Cl.² B65D 25/08
U.S. Cl. 206—219 16 Claims



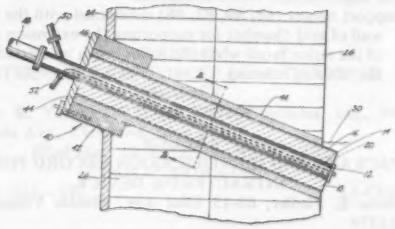
1. A packing container for dental impression material which container comprises in combination, a container portion having walls formed of flexible material and having a restricted area defining two compartments, a clamping means having a passage disposed to encircle the restricted area and having separate means oppositely disposed relative a perpendicular plane through said passage for convolutely clamping the wall portions of the container.

4,023,676

LANCE STRUCTURE AND METHOD FOR OXYGEN REFINING OF MOLTEN METAL

Howard W. Bennett, Houston, and Orand L. Lambert, Conroe, both of Tex., assignors to Armco Steel Corporation, Middletown, Ohio

Filed Sept. 20, 1976, Ser. No. 725,028
Int. Cl.² C21C 5/48
U.S. Cl. 266—222 12 Claims



1. A lance construction for supplying pressurized fluids beneath the surface of molten metal in a refractory lined refining vessel, said refractory lining being subject to erosion as successive heats of refined metal are produced, said lance construction comprising three concentric tubes extending through a side wall of said vessel and terminating in a common discharge plane beneath said molten metal surface adjacent said lining; means for supplying an oxygen-bearing gas to the innermost one of said tubes; an annular space between said innermost tube and the second of said tubes; means for supplying a shroud gas to said annular space; another annular space between said second tube and the outermost tube; a refractory material in said other annular space between said second tube and said outermost tube; a pair of parallel auxiliary cooling pipes encased in said refractory material and terminating in said common discharge plane, said pipes being disposed on opposite sides of said second tube and being centered on the horizontal diameter of said three tubes; and means for supplying a cooling gas to said auxiliary pipes, said pipes being positioned a distance sufficiently remote from said second tube that cooling gas supplied to said pipes does not

intermix with said oxygen-bearing gas at the discharge end of said lance.

4,023,677

CLEANING DEVICES FOR RECORDS AND PICKUP STYLI

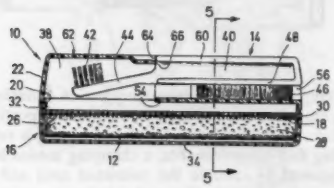
Rudolf Wittner, Friedrich-Silcher-Str. 20, and Fritz Härle, Mechenseestr. 4, both of 7972 Isny, Germany

Filed Mar. 11, 1976, Ser. No. 666,068

Claims priority, application Germany, Mar. 14, 1975, 2511129

Int. Cl.[2] A45C *11/00*; B65D *69/00*; A46B *11/00*; A47L *13/00*

U.S. Cl. 206—229 11 Claims



1. In an apparatus for cleaning records and pickup styli, including a hollow housing (22) containing at one end a chamber (38), the upper portion of the other end of said housing containing an opening (36) communicating with said chamber for slidably receiving the handle portion (40) of a stylus brush (14), said stylus brush having an extension portion (44) which is adapted to extend within said chamber and which carries upwardly extending stylus-cleaning bristles; record cleaning means (28, 12) carried by the bottom portion (18) of said housing; and an open-topped trough-shaped closure member (16) connected with the bottom portion of said housing to enclose said record cleaning means;

the improvement which comprises

support means (68; 80, 82, 88) connected with the bottom wall of said chamber for supporting the extension portion of the stylus brush when the stylus brush is inserted within the housing opening.

4,023,678

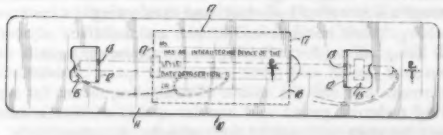
PACKAGE AND IDENTIFICATION RECORD FOR AN INTRAUTERINE DEVICE

Dolores E. Fiedler, 68-15 Eliot Ave., Middle Village, N.Y. 11379

Continuation-in-part of Ser. No. 484,783, July 1, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,019

Int. Cl.[2] B65D *83/10*; A61B *19/02*

U.S. Cl. 206—363 2 Claims



1. The combination of a package and an intrauterine device comprising an elongated strip of material having a length at least equal to the length of said device including the support therefor, and a pair of longitudinally spaced supports extending from one surface of said strip engaging and retaining said device in position thereon, said strip of material including an area within the confines of said strip defined by a line of perforations in said material forming a card having indicia for the insertion of pertinent data thereon to provide a permanent record for the user of said device.

4,023,679

PLASTIC BARREL

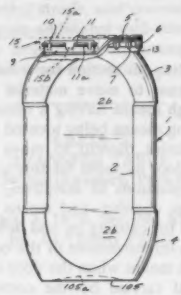
Theo Hammes, Cologne, Germany, assignor to Mauser Kommanditgesellschaft, Bruhl, Germany

Filed Apr. 1, 1975, Ser. No. 564,141

Claims priority, application Germany, Apr. 5, 1974, 7411989[U]

Int. Cl.[2] B65D *21/00*, *7/02*, *7/42*

U.S. Cl. 206—504 10 Claims



1. A container, particularly a blow molded barrel consisting at least in part of synthetic thermoplastic material, comprising a circumferential wall having two stacking flats disposed opposite each other; a first end wall at one end of said circumferential wall; a second end wall at the other end of said circumferential wall, one of said end walls having an outer stacking surface, a circumferential bead having a serrated peripheral surface and extending outwardly beyond said outer surface so that it can surround the other end wall of a similar second container when the two containers are stacked end-to-end, an eccentric opening, a mouth surrounding said opening, and an arcuate groove surrounding at least a portion of said mouth; and a cover detachably secured to said one end wall to close said opening, said cover having an outer substantially planar stacking side which is at least substantially flush with and constitutes an extension of said outer surface of said one end wall so that a similar second container can be supported by said outer stacking surface of said one end wall and also by said outer stacking side of said cover when the two containers are stacked end-to-end.

4,023,680

BAKERY TRAY

Paul G. Thurman, West Liberty, Ohio, assignor to Dare Plastics Inc., Urbana, Ohio

Filed Sept. 22, 1971, Ser. No. 182,728

Int. Cl.[2] B65D *21/04*

U.S. Cl. 206—507 6 Claims

1. A unitary molded plastic nesting and stacking tray for storing and transporting bakery goods and the like,

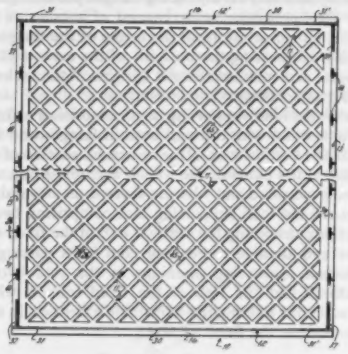
said tray being rectangular when viewed in a top plan view and having a bottom wall, a pair of opposed end walls, and a pair of opposed side walls,

said end walls being substantially shorter in length than said side walls and said side walls being substantially shorter in height than said end walls whereby a like tray in like orientation may be stacked thereon and when oriented at 90° with respect to a like tray may be nested therein,

said end walls because of their greater height and shorter length having substantially greater resistance to torsional flexure of the tray than said side walls,

the improvement wherein said bottom wall consists of a

plurality of crossing ribs defining rows of openings therebetween, said bottom ribs being T-shaped in cross section



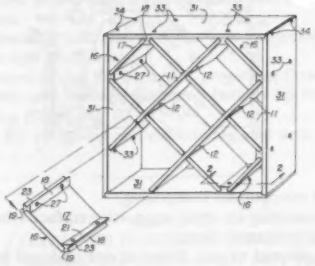
and extending diagonally across the bottom of said tray at an acute angle to the side and end walls.

4,023,681

KNOCK-DOWN WINE BOTTLE RACK

David N. Plant, 2789 25th St., San Francisco, Calif. 94110

Filed Jan. 8, 1976, Ser. No. 647,359
Int. Cl.² A47B 73/00
U.S. Cl. 211—74 3 Claims



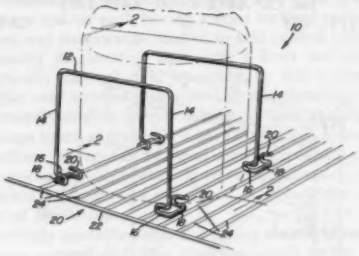
1. A rack comprising four frame members forming a rectangular frame, a first pair of partitions within said frame parallel to each other and disposed in a first direction at a 45° angle to said frame members, a second pair of partitions within said frame parallel to each other, disposed in a second direction transverse to said first direction, first means interconnecting said partitions at their intersections, an end piece for each end of each pair of partitions disposed across a corner of said frame, and second means securing opposite ends of said end piece to each of two said frame members, each said end piece comprising a base transverse to the direction of the partitions to which said end piece is connected and edge members along opposite edges of said base, one side of said edge member opposite said base being formed with a groove at a right angle to a plane perpendicular to said partitions and to said base, said groove receiving one corner of one of said partitions, said second means passing through said edge member and securing said edge member to one of said frame members, said second side of said edge member opposite said one side being formed with a second groove similar to said first-mentioned groove receiving one corner of said base, the length of each said partition being at least three times the length of said base.

4,023,682

DEVICE FOR SECURING CONTAINERS TO REFRIGERATOR SHELVES

Melvin L. Niece, Lakeview, Ohio, assignor to NBS, Incorporated (Entire), Huntsville, Ohio

Filed Nov. 5, 1975, Ser. No. 629,614
Int. Cl.² A47F 7/14
U.S. Cl. 211—184 6 Claims



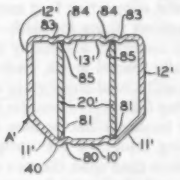
1. An adjustable article retaining device for use with a shelf, said shelf comprising a pair of spaced support rails and a plurality of spaced connecting wires extending perpendicular to said supports rails, said adjustable retaining device comprising; a wire rod main body member having clip means at each end thereof for frictional retention and adjustment with the said spaced connecting wires when the device is in use therewith, and said clip means further including means for increasing the retaining friction thereof when the wire rod main body member has lateral force applied thereto by an article to be retained when said article tends to slide along the shelf, said clip means includes two U-shaped clips provided at each end of the main body member and spaced apart a short distance so as to provide the means for increasing the frictional retention force whenever force is applied on the upper portion of the main body member.

4,023,683

INTERNALLY REINFORCED LOAD CARRYING MEMBER

William R. Vargo, c/o Husky Storage Systems, Inc., 9111 Nevada Ave., Cleveland, Ohio 44104

Filed Mar. 12, 1975, Ser. No. 557,802
Int. Cl.² A47B 43/00
U.S. Cl. 211—192 13 Claims



1. A structural member for supporting heavy loads comprised of a hollow rigid member having walls of generally uniform thickness and a reinforcing web extending across the interior of said member between said walls, said walls having at least a pair of external longitudinally extending indentations causing a pair of longitudinally extending beads on the inside of the said walls, means coacting with each of said beads to define therewith a longitudinally extending shallow groove with said grooves being oppositely disposed, the longitidinal edges of said web bearing against the bases of said recesses whereby the sides of said recesses restrict movement of said edges in a direction perpendicular to the plane of said web,

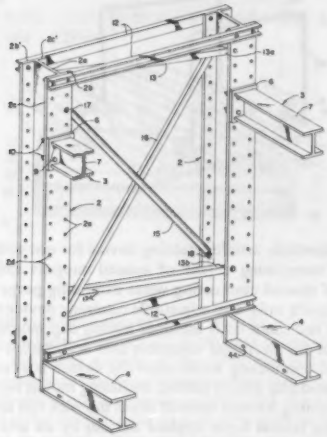
whereby said web contributes to the bending strength of said hollow member.

4,023,684

CANTILEVER RACK STRUCTURE

David M. Saul, Pittsburgh, Pa., assignor to Rack Engineering Company, Connellsville, Pa.

Filed Sept. 8, 1975, Ser. No. 611,562
Int. Cl.² A47B *43/00*; A47F *5/01*
U.S. Cl. 211—193 **3 Claims**



1. A cantilever rack structure comprising:

a. at least two vertical uprights of wide flange I-beam section each with a solid central web and with forwardly and rearwardly facing solid flanges, the webs of the I-beams being in spaced parallel planes and the forwardly facing flanges being in a common plane and with the rearwardly facing flanges being in a common plane, the forwardly facing flanges of each upright having a vertical row of evenly spaced holes therethrough at each side of but spaced laterally from the web and extending throughout the greater portion of the length of the upright from top to bottom, the holes in the flanges of one upright being at about the same level above the bottom of the upright as the corresponding holes in the forwardly facing flange of the other upright;

b. a structural section at the lower end of each upright extending forwardly from the front flange and comprising a rigid horizontal supporting foot member for stabilizing the standard against tilting forward;

c. cantilever arm members adjustably secured to each upright at vertically spaced levels, each arm member comprising a plate and a load-supporting arm rigidly attached to and extending forwardly from the plate member, each plate member having a flat surface bearing against the forwardly facing flange of the upright and of a width adequate to more than span the two rows of holes in the I-beam flange, and of a length from top to bottom at least as great as the vertical dimension of the load supporting arm;

d. each plate having at least two horizontally spaced bolts projecting from the upper portion of the rear face of the plate, each bolt registering with a selected one of the holes in the said vertical row of holes at each side of the web of the upright against which it bears, there being a nut at the rear face of said flange screwed on each bolt whereby the base plate of each cantilever arm member is tightly but removably clamped against the flange to which it is secured by the bolts and nuts;

e. the two rows of holes in each upright being spaced from the webs of the I-beams a distance sufficient to provide clearance for wrenches used in tightening or loosening the nuts and bolts with the distance between the forwardly and rearwardly facing flanges providing clearance for the application and removal of nuts to of from the bolts, but inwardly from the edges of the flanges;

f. means connecting the uprights of the rack structure, the several arm members on the uprights of the rack structure being at corresponding levels; and

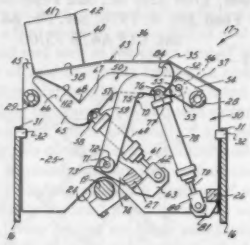
g. each said load supporting arm comprising a fixed structural section with top and bottom flanges and a vertical web, the vertical web of the structural section of each arm being in the plane of the web of the upright on which the arm is mounted and wherein there is an adjustable extension on the load supporting arm comprising two parallel sections straddling the vertical web of the fixed structural arm and slidable therealong, and bolts passing through selected registering openings in the said two parallel sections and the web of the fixed section which they straddle for holding the adjustable extension in a selected position on the fixed section.

4,023,685

BILLET MANIPULATOR

Earl L. Bishop, Cuyahoga Falls, and James L. Giffels, Akron, both of Ohio, assignors to Akron Standard, division of Eagle-Picher Industries, Inc., Akron, Ohio

Filed Dec. 15, 1975, Ser. No. 640,491
Int. Cl.² B65G *7/00*
U.S. Cl. 214—1 QG **11 Claims**



1. A billet manipulator comprising,

a frame presenting an upper supporting surface lying generally in a horizontal plane,

a lift arm pivoted to said frame at one end and having an L-shaped free end having an upwardly projecting leg,

means for swinging said arm up and down,

said leg, upon upward movement of said arm, being engageable with the under side of a billet supported on said surface to rotate said billet through an angle greater than 45°,

said billet, upon downward movement of said arm, engaging said surface and rotating through an angle to rest on the surface of said frame.

4,023,686

DOLLY FOR MANEUVERING MODULES OF A MODULAR WALL SYSTEM

William G. Papsco; Harry Cohn, Jr., both of Portola Valley, and Rufus C. Bean, Clipper Mills, all of Calif., assignors to Papsco, Inc., Sunnyvale, Calif.

Filed Apr. 30, 1974, Ser. No. 465,523
Int. Cl.² B25B *1/22*
U.S. Cl. 214—1 H **6 Claims**

1. A dolly movable over floor means comprising

a base frame,

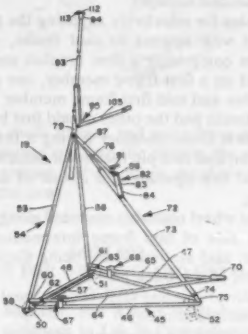
means for supporting said frame for movement over said floor means,

a front frame extending upwardly from and pivotally supported on the front part of said base frame for pivotal movement between a first plane perpendicular to said floor means and a second plane inclined to the floor means rearwardly over said base frame,

bottom lip means on the lower end part of said front frame and projecting forwardly therefrom,

a variable length brace interconnecting the upper part of said front frame and the rear part of said base frame,

means for raising and lowering said front frame relative to said base frame whereby to raise and lower said bottom lip means relative to said floor means comprising rear-



wardly extending lever means pivotally supported on said base frame, said lever means being pivotally connected at the forward end thereof to said front frame, said pivotal connection of said lever means to said front frame defining the axis of pivotal movement of said front frame relative to said base frame between said first and second planes,

an extendible and contractible arm projecting upwardly from said front frame,

said arm having top lip means projecting forwardly therefrom and defining with said bottom lip means a gripping plane, and

means for extending and contracting said arm.

4,023,687

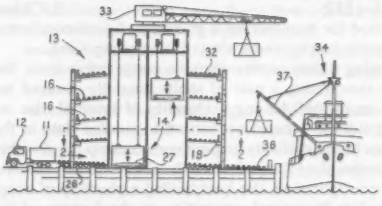
CONTAINER HANDLING STRUCTURE

Charles R. Salloum, 120 Ellis St., Apt. 307, San Francisco, Calif. 94102

Continuation-in-part of Ser. No. 287,750, Sept. 11, 1972, abandoned, which is a continuation of Ser. No. 52,381, July 6, 1970, abandoned, which is a continuation-in-part of Ser. No. 720,952, April 12, 1968, Pat. No. 3,613,909, which is a continuation-in-part of Ser. No. 404,622, Oct. 19, 1964, Pat. No. 3,378,151, and a continuation-in-part of Ser. No. 646,671, June 16, 1967, Pat. No. 3,382,990. This application Feb. 27, 1975, Ser. No. 553,600

Int. Cl.² E04H 6/06

U.S. Cl. 214—16.4 R 4 Claims



1. A container storage system comprising

a building structure comprising a plurality of vertically spaced storage levels with a circular wall thereabout,

A central core extending through said storage vessels with at least one annular rotary-mounted storage platform at each level with each platform having a plurality of circumferentially spaced storage spaces extending radially across the platform and each space having rollers rotatably mounted laterally thereacross for facilitating the movement of a container into and out of the space, said storage spaces each having a floor inclined radially outward and downwards relative to said central core,

a plurality of elevators each with a floor and extending vertically through said structure in said central core within said annular platforms and said elevators opening outwardly directly onto a storage platform at each of said storage levels at the upper end of the storage spaces of the platform adjacent said central core, each of said elevators having controllably operable conveyor means on the floor thereof for horizontal movement of a container into and out of an elevator,

controllably operable unloading means at each of said levels having controllable drive means mounted on the interior surface of said circular wall above the end adjacent the lower most portion of the inclined floor in alignment with at least one elevator at each storage level and an element movable thereby for engaging a container disposed in a storage space aligned with an elevator and urging the container toward and at least partially into the elevator onto the conveyor thereof whereby the container may be drawn into said elevator, and

controllable drive means for rotatably indexing said storage platforms to align any desired storage space with a selected elevator whereby all storage spaces may be loaded and unloaded in any desired order.

4,023,688

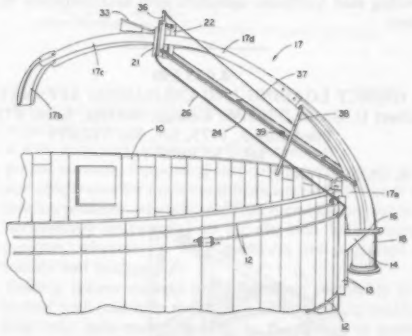
SILO FILLING APPARATUS

Andrew S. Freeman, W. Lafayette, and John R. Haan, Mulberry, both of Ind., assignors to Even Flo Silage Distributor, Inc., Lafayette, Ind.

Filed Apr. 29, 1976, Ser. No. 681,416

Int. Cl.² B65G 65/30

U.S. Cl. 214—17 C 11 Claims



1. Apparatus for completely filling a silo by depositing silage from a central point adjacent the upper end of a silo, said apparatus comprising a fill tube having an arcuate configuration and supported at one of its ends adjacent the upper margin of the silo and extending radially across the top of the silo to locate the free end of the fill tube at the central vertical axis of the silo, the supported end of said fill tube being adapted to receive silage with the silage moving through the fill tube and dropping from the free end thereof downwardly into the silo, said fill tube being hinged intermediate its ends on a vertical pintle disposed adjacent one side of said tube to permit the

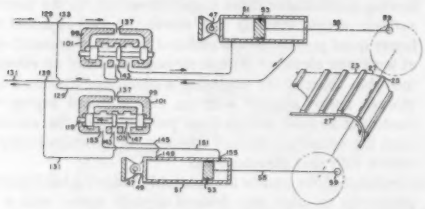
outer portion of the fill tube to swing sidewardly with relation to the stationary portion when the apex of the silage deposited in the silo reaches said free end of the fill tube, and a spreader plate hinged on a horizontal axis to the stationary portion of the fill tube and movable into cooperating relation with said stationary portion after said extending portion has swung sidewardly to thereafter direct the flow of silage from said stationary portion toward the far wall of the silo.

4,023,689

CONVEYOR-TYPE, HYDRAULIC-POWERED, MATERIAL-SPREADING APPARATUS

Bruce W. Taylor, Mechanicville, and Gregory J. Murray, Saratoga Springs, both of N.Y., assignors to Tarrant Manufacturing Company, Saratoga Springs, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,032
Int. Cl.² B65G *23/06*
U.S. Cl. 214—17 D **18 Claims**



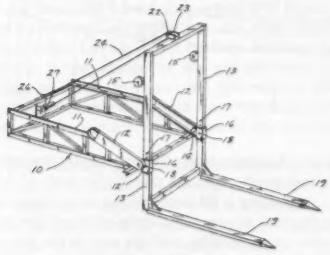
1. A conveyor-type, hydraulic-powered, material-spreading apparatus comprising: a material-storage hopper, a conveyor for conveying said material from said hopper for spreading same, two hydraulic cylinders and spool valve means, said hydraulic cylinders being double-acting, said hydraulic cylinders being 90° out of phase with each other, each of said hydraulic cylinders having a piston, and wherein and whereby drive is imparted by push or pull of said pistons, said hydraulic cylinders communicating with said valve means, means operatively connecting said hydraulic cylinders and valve means to actuate said valve means, said valve means controlling and directing a source of hydraulic fluid under pressure to said hydraulic cylinders to drive same and means operatively connecting said hydraulic cylinders with said conveyor to drive same.

4,023,690

OBJECT LOADING AND UNLOADING APPARATUS

Robert D. Goode, 7201 W. Kellogg, Wichita, Kans. 67207

Filed July 2, 1975, Ser. No. 592,479
Int. Cl.² B60P *1/32*
U.S. Cl. 214—146.5 **1 Claim**



1. Apparatus for loading and unloading objects comprising:
a framework rigidly attached to a prime mover;
a frame having a pair of fork members connected thereto adjacent one end thereof, said fork members being disposed at a right angle with respect to said frame, said frame being pivotally mounted on said framework;
track means rigidly connected to said framework, said track means including a first section which is substantially horizontally disposed and a second section which is inclined at an angle between vertical and horizontal whereby one end of said track means is lower than the other end thereof;
a first wheel rotatably mounted along a first axis to one side of said frame intermediate the ends of the frame, said first wheel being disposed on the second section of the track means;
means for preventing said first wheel from moving out of said second section;
first means for selectively adjusting the position of said first wheel with respect to said frame, said first adjusting means comprising a first bracket member slideably received on a first frame member, one of said first bracket member and said first frame member having a first opening therein and the other of said first bracket member and said first frame member having a first plurality of holes therein, and first pin means for selectively being received in said first opening and in one of said first plurality of holes;
a second wheel rotatably mounted along said first axis to the other side of said frame intermediate the ends of the frame, said second wheel being disposed on the second section of the track means;
means for preventing said second wheel from moving out of said second section;
second means for selectively adjusting the position of said second wheel with respect to said frame, said second adjusting means comprising a second bracket member slideably received on a second frame member, one of said second bracket member and said second frame member having a second opening therein and the other of said second bracket member and said second frame member having a second plurality of holes therein, and second pin means for selectively being received in said second opening and in one of said second plurality of holes;
a third wheel rotatably mounted along a second axis to said one side of the frame, said third wheel being receivable on the first section of said track means;
a fourth wheel rotatably mounted along said second axis to said other side of the frame, said fourth wheel being receivable on the first section of said track means; and
actuating means for selectively moving said frame with respect to said framework, said actuating means including a winch connected to said framework, a pulley connected to the other end of said frame, and a cable connected to said winch at one end thereof and to said framework at the other end thereof, said cable being disposed around one side of said pulley.

4,023,691

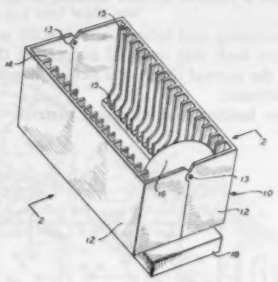
METHOD OF TRANSFERRING SEMI-CONDUCTOR DISCS BY A HINGED TRANSFER CARRIER

Richard Perel, Somerville, N.J., assignor to United States Fused Quartz Company, Inc., Fairfield, N.J.

Filed Sept. 15, 1975, Ser. No. 613,626
Int. Cl.² A47F *1/08*; F27D *5/00*, *15/00*; G07F *11/48*
U.S. Cl. 214—152 **2 Claims**

1. A method for transferring a plurality of semi-conductor discs between a carrier and a slotted boat comprising:
a. positioning a disc carrier above a cooperative boat, the carrier comprising a pair of shells hingedly secured together, each shell having a plurality of internal disc receiving slots in general opposition to similar slots in the other shell, the shells having means to entrap discs within said internal slots thereof when the shells are pivoted into closed configuration, the boat having a plurality of cooperative slots in general opposition to the bottom of the carrier,

b. the carrier and boat being positioned with respect to each other so that all discs are simultaneously in registration with the slots in the shells and the boat,



c. pivoting the shells toward and away from each other to alternately engage and trap the discs in the opposed slots thereof and release and discharge the discs therefrom to the slots of the boat.

4,023,692

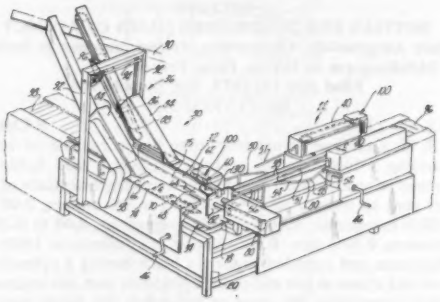
APPARATUS FOR OPENING AND UNLOADING CARTONS

Delbert J. Ittner, Saginaw, and Robert W. Hofstetter, Fenton, both of Mich., assignors to I & H Conveying and Machine Company, Clio, Mich.

Continuation-in-part of Ser. No. 490,681, July 22, 1974, Pat. No. 3,937,342. This application Dec. 15, 1975, Ser. No. 640,752

Int. Cl.² B65G *65/42*

U.S. Cl. 214—304 **13 Claims**



1. An apparatus for opening the flaps of a carton filled with articles and for unloading the articles from the cartons comprising:

first conveyor means for moving the cartons in a first direction;

carton outer flap folding means associated with said first conveyor means for folding the outer flaps of the carton from a closed position over the opening to the carton to a folded position away from their closed position as the cartons move in said first direction;

second conveyor means for moving the cartons in a second direction disposed at a predetermined angle to said first conveyor means;

carton inner flap engaging and folding means associated with said second conveyor means for folding the inner flaps of the carton from a closed position over the opening in the carton to a folded position as the cartons move in said second direction;

transfer means disposed between said first conveyor means and said second conveyor means for transferring said cartons from said first conveyor means to said second conveyor means; and

third conveyor means disposed adjacent the end of said second conveyor means and extending upwardly away therefrom whereby to remove the cartons from said second conveyor means, the articles remaining on said second conveyor means; and said first conveyor means comprising a pair of parallel spaced apart elongated tracks longitudinally disposed in said first direction of travel to support the cartons as they move in said first direction; a pair of spaced apart first drive means disposed on opposite sides of said pair of tracks for engaging the opposite longitudinal sides of the cartons and moving them in said first direction; said carton outer flap engaging means comprising a support plate having a tapered end aligned with said elongated tracks and facing against said first direction of movement of said carton to be received between the carton outer flaps and the carton, said support plate having downwardly extending means fixed to the bottom of said support plate for initiating the opening of said outer flaps and being adapted to engage the inner flaps of the carton to prevent them from folding partially open due to the weight of the articles in the carton; and a pair of spaced apart outer flap folding bars, said bars being disposed on opposite sides of said pair of elongated tracks to engage said outer flaps and fold them as the carton moves in said first direction.

4,023,693

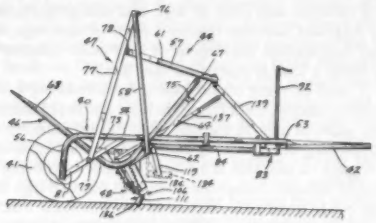
APPARATUS FOR HANDLING A LARGE HAY BALE

William D. Priefert, Mount Pleasant, Tex., assignor to Priefert Mfg. Co., Inc., Mount Pleasant, Tex.

Filed Feb. 6, 1976, Ser. No. 656,025

Int. Cl.² B60P *1/04*

U.S. Cl. 214—354 **9 Claims**



1. A bale handling machine comprising:

a. a portable frame,

b. a bale receiving unit having fork members,

c. means movably supporting said bale receiving unit on the portable frame for movement from a ground lowered bale loading position, wherein said fork members are extended horizontally rearwardly, to an elevated bale transport position, wherein the fork members are projected upwardly and rearwardly,

d. holding means on said portable frame releasably interlocked with said bale receiving unit supporting means to hold said bale receiving unit in the transport position therefor,

e. manually actuated means on said portable frame for operating said releasable holding means to release said bale receiving unit supporting means for movement to a bale loading position for said bale receiving unit,

f. said portable frame, when the bale receiving unit is in the loading position therefor, being movable rearwardly relative to a ground supported bale to load the bale on the receiving unit, and

g. means responsive to a forward advance of the portable frame, including a ground engageable lever means movably supported on the bale receiving unit and a lift lever

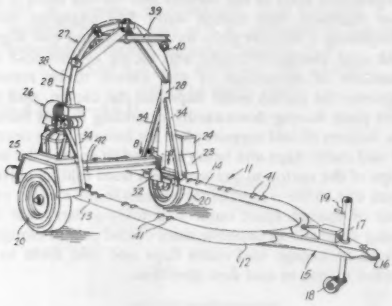
means interconnecting said portable frame and bale receiving unit supporting means, for elevating the bale receiving unit to the transport position therefor.

4,023,694

TRAILER FRAME WITH LOAD BUNKS

Lloyd J. Hawkins, 14922 Coldwater Road, Fort Wayne, Ind. 46825

Filed Aug. 15, 1975, Ser. No. 605,038
Int. Cl.² B60P 1/54, 3/32
U.S. Cl. 214—396 17 Claims



1. A load-carrying trailer assembly comprising a wheeled main frame having two side arms of substantially regular geometric cross-section, at least one set of transversely aligned pairs of spaced lugs on each of said side arms, each of said lugs being fixedly secured to said side arms; at least one load supporting bunk having projections at either end thereof, the width of said projections being approximately equal to the spacing between said pairs of lugs; and said projections being snugly disposed between opposite pairs of said lugs, so as to prevent longitudinal movement of said bunk relative to said frame when a load is placed on said bunk.

15. A load-carrying trailer assembly comprising a wheeled generally U-shaped main frame, at least one set of transversely aligned. pairs of lugs on the side arms of said main frame, and loadsupporting bunks having end portions formed to supportingly engage on said side arms, said end portions being closely receivable between transversely aligned pairs of lugs to maintain the bunks transverse relative to said side arms when a load is placed on the bunks and to prevent shifting of the bunks, and a transversely extending vertical hoist arch member secured on said main frame, said hoist arch member having respective side post elements extending perpendicular to the side arms of the main frame, and upstanding bars on the arch member spaced from the side post elements extending perpendicular to the side arms of the main frame and defining therewith receiving spaces for the end portions of the bunks, and removable retention pins extending through the bars and located to retentively overlie the end portions of the bunks, for retentively storing the bunks in stacked transverse positions when not in use.

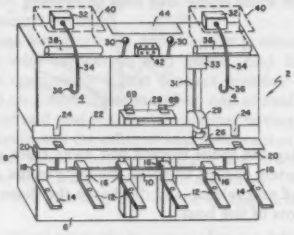
4,023,695

MOBILE STACKER WITH A WORK STATION THEREON

Victor E. Carew, 610 W. Taylor Run Parkway, Alexandria, Va. 22314

Division of Ser. No. 497,012, Aug. 13, 1974, Pat. No. 3,922,941, which is a continuation-in-part of Ser. No. 364,388, May 29, 1973, abandoned. This application June 20, 1975, Ser. No. 588,911
Int. Cl.² B65G 47/00
U.S. Cl. 214—674 3 Claims

1. A mobile work station comprising:
a movable trolley;
a vertical columm movably mounted on said trolley;
a housing structure selectively movable vertically along said column, said housing structure including at least one compartment capable of supporting a person therein;
a ledge-fence having a horizontal material supporting surface and a vertical surface forming a right angle therewith;
means mounting said ledge-fence directly on said housing structure such that material supporting thereon will be within the normal reach of a person standing within said compartment;
means for holding and retaining material on said ledge-fence;



a vertical mast pivotally mounted on said housing structure below said ledge-fence;
means for pivoting said mast;
fork carriage means mounted on said mast for vertical movement thereon;
a winch;
hoist line means connected to said winch for attaching to material to be lifted; and
means mounting said winch and hoist line means on said housing structure on an upper surface thereof.

4,023,696

BOTTLES FOR COMPRESSED GASES OF AU6MGT

Marc Anagnostidis, Chamalieres, France, assignor to Societe Metallurgique de Gerzat, Paris, France

Filed July 29, 1974, Ser. No. 492,905
Int. Cl.² F25J 5/00
U.S. Cl. 220—3 8 Claims

1. In a method of manufacturing bottle capable of withstanding a high internal pressure, in which said bottle is formed of an aluminum based alloy consisting essentially of, in per cent by weight, approximately, 5 to 7% copper, 0.05 to 0.50% manganese, 0.10 to 0.50% magnesium, 0.05 to 0.25% titanium, 0.50% iron, 0.30% silicon, the balance to 100% of aluminum and extruded to form a blank having a cylindrical part and a base at one end of the cylindrical part, the improvement comprising, the steps of subjecting the blank successively to a solution heat treatment for 1 to 4 hours at 510°/540° C, to quenching in water, to natural aging for several days at ambient termperature and then to cold working to a level of from 5 to 30%, by drawing in the absence of a support and drawing on a mandrel, which brings the blank to its final dimensions by reducing its initial diameter by 2 to 10%.

4,023,697

WALL SWITCH AND OUTLET FRAME

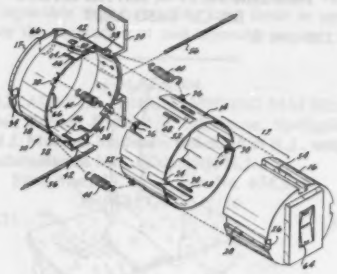
Louis Marrero, 1209 Via Ramon, Escondido, Calif. 92025

Filed July 29, 1976, Ser. No. 709,629
Int. Cl.² H02G 3/08
U.S. Cl. 220—3.4 5 Claims

1. An electrical fixture for mounting in the wall of a building and to be accessible through a wall thereof, said fixture comprising:
a. a mounting bracket;
b. a wiring box receivable in said mounting bracket and

when received therein having at least limited freedom of movement in the direction perpendicular to a wall through which said fixture is to be accessible;

c. means biasing said wiring box forward on said mounting bracket toward said wall; and



d. means to lock said wiring box in said bracket against movement upon installation of said wall and subsequent to properly aligning said wiring box relative to said wall.

4,023,698

HANDLING CONTAINER, NOTABLY PALLET TOTE OR HEIGHTENING BOX

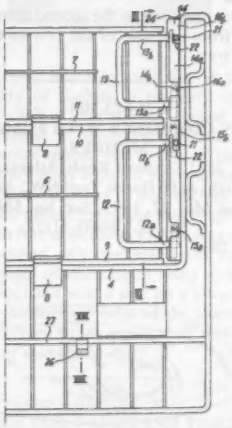
Raymond Joseph, Schiltigheim, France, assignor to Ateliers Reunis Societe Anonyme, Schiltheim, France

Filed July 1, 1976, Ser. No. 701,867

Claims priority, application France, July 10, 1975, 75.21666

Int. Cl.² B65D *7/24, 7/20, 51/04*

U.S. Cl. 220—7 **7 Claims**



1. A container for handling and storage purposes, such as a tote box or a pallet heightener, having a substantially parallelipipedic configuration and at least one opening in at least one side wall which is closed by one or a plurality of hingedly mounted shutters adapted to be tilted downwards to their open position, wherein each shutter comprises at least one lock bolt rigidly secured to each side edge, the registering edges of said opening comprising each a fixed vertical retaining slideway consisting of a U-sectioned member having its aperture coplanar with, and facing, said shutter, said slideway being adapted to be engaged by said lock bolt, the outer wing of said U-shaped section comprising a notch permitting the passage of said lock bolt therethrough, said notches being disposed at a level somewhat higher than that occupied by said lock bolts in the normal closed position of said shutter, said shutters being hingedly mounted on the container by means of elongated rings permitting the upward movement of said shutters as necessary for inserting said lock bolts into said notches.

4,023,699

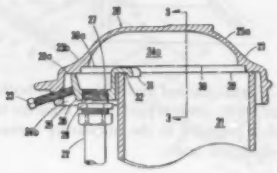
CAP ASSEMBLY FOR MULTI-SIZE WELL CASINGS

Neil C. Lien, Evansville, Wis., assignor to Baker Manufacturing Company, Evansville, Wis.

Filed Sept. 29, 1976, Ser. No. 727,711

Int. Cl.² H02G *3/08*

U.S. Cl. 220—3.8 **4 Claims**



1. A cap assembly for capping the upper ends of a well casing and adjacent electrical conduit, said cap assembly comprising:

a. a cap member having a main dome portion defining a casing chamber of generally circular cross-section and a dome extension portion defining an adapter chamber in open communication with said casing chamber;

b. an electrical conduit adapter for mounting on the electrical conduit and being received within said adapter chamber;

c. a stepped series of annular downwardly facing bearing lands of progressively smaller diameter formed in said main dome and dome extension portions about the periphery of said chambers for selective seating of the bearing lands on the upper end of various sized well casings;

d. said bearing lands having substantially straight sections converging away from said casing chamber, and said electrical conduit adapter having an outer taper complimentary to the convergence of the straight sections of said bearing lands for selective seating of said bearing land sections on said electrical conduit adapter, said adapter mating with the straight bearing land sections of the selected one of said bearing lands seated on said well casing; and

e. tightening means for clamping said adapter and said cap member in mating relation when said cap member is seated on the upper end of the well casing and said adapter is mounted on the electrical conduit.

4,023,700

CONTAINER FOR PRESSURIZED LIQUID HAVING A NON-RIGID WALL

Alain Buquet, Gif-sur-Yvette, and Louis Doyen, Lyon, both of France, assignors to SCAL - Societe de Conditionnements en Aluminum, Paris and Thimonnier S.A., Lyon, both of, France

Filed May 4, 1976, Ser. No. 682,907

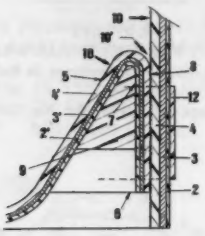
Claims priority, application France, May 23, 1975, 75.16737; Feb. 13, 1976, 76.04522

Int. Cl.² B65D *7/12, 7/44, 25/14*

U.S. Cl. 220—63 R **5 Claims**

1. A flexible wall container for packaging pressurized liquids comprising, a cylindrical body of flexible material, a base member closing each end of said container, at least one of said base members of generally conical configuration with the apex thereof facing axially outwardly of the container end, the edge of said one base member being turned outwardly to define an annular wall, said wall being secured to the inside of said

cylindrical body, and a rigid pressure transmitting annular reinforcing element received within the peripheral channel formed between the turned edge and the generally conical part of the base member, said reinforcing element filling at



least a portion of said channel and adhering to both the turned edge and the generally conical part of the base for transmitting internal container pressure to the outwardly turned edge and surrounding cylindrical body.

4,023,701

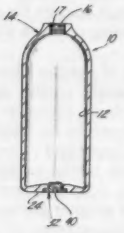
BREATHING APPARATUS FOR UNDERWATER USE

Denzel J. Deckery, G-4142 Fenton Road, Flint, Mich.

Continuation-in-part of Ser. No. 447,477, March 4, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,618

Int. Cl.² B65D *25/14*

U.S. Cl. 220—64 **5 Claims**



1. A tank for underwater use of the type adapted to be pressurized with a breathable gas and depressurized underwater to provide the gas to a user, said tank comprising:

a container defining a chamber and having a first and second aperture communicating with said chamber;

a pressure regulating means removably secured to said container and having a portion extending axially into said first aperture, said pressure regulating means further comprising a filter secured to said portion and extending axially into said chamber whereby said filter is removed from said chamber through said first aperture upon the removal of said pressure regulating means;

a liner coated onto the surface of said chamber to protect said tank from corrosion whereby-the liner adheres to the surface of the chamber;

said chamber being completely filled with a gas and liquid adsorbent material insertable into said container through said second aperture whereby said material both adsorbs corrosive liquids from said chamber and permits the storage of a greater amount of gas within the chamber than without the material, wherein said material is firmly packed into said chamber to prevent floating dust particles of said material whereby said material holds said liner onto the surface of the chamber upon a rapid decompression of the tank, and wherein said material has greater heat transfer properties than the gas so that said material transfers heat to said tank upon rapid compression of said tank; and

means for sealing said second aperture.

4,023,702

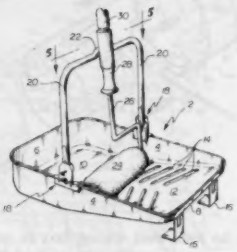
PAINT TRAY HANDLE AND ROLLER SUPPORT

Virgil L. McKnight, 12307-2nd NE., Seattle, Wash. 98125

Filed June 14, 1976, Ser. No. 695,598

Int. Cl.² B65D *25/28*

U.S. Cl. 220—94 R **3 Claims**



1. A handle for a paint tray or the like, comprising:

a. first clamping means for placement upon the exterior of the opposite sides of the tray, said means including a lower portion for frictional contact with side of the tray, a pair of outwardly projecting ears for contact with the top edge of thetray and a portion projecting above the ears to support the handle,

b. second clamping means for placement upon the interior of opposite sides of the tray cooperating with the first clamping means, said second clamping means including a lower portion for frictional contact with the tray and an upper portion for interaction with the first clamping means, and

c. handle means secured to the second clamping means and extending from one side of the tray to the other spaced above the tray.

4,023,703

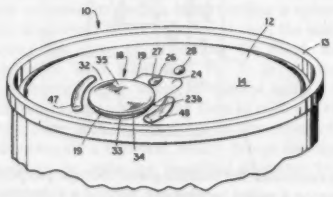
EASY-OPEN CONTAINER WITH FLANGE PUSH-IN MEMBER

Carl J. Strobe, 2831 Orchard Knob, Atlanta, Ga. 30309, and Robert A. Wells, 4450 Harris Trail NW., Atlanta, Ga. 30327

Filed May 27, 1975, Ser. No. 580,624

Int. Cl.² B65D *41/32*

U.S. Cl. 220—268 **47 Claims**



1. Easy opening wall structure for a container, comprising:

a wall having an outer side and an innter side;

an openable member defined in said wall by a selectably separable region of weakness completely surrounding said openable member;

opening tab means disposed on said openable member and including a portion which overhangs at least part of said separable region for contacting said outer side to prevent said openable member from becoming moved more than a predetermined distance inwardly relative to said wall, and to support said opening tab means for sliding dis-

placement along said outer side when said separable region becomes separated;

said opening tab means having force receiving area to receive an externally applied force directed toward said openable member; and

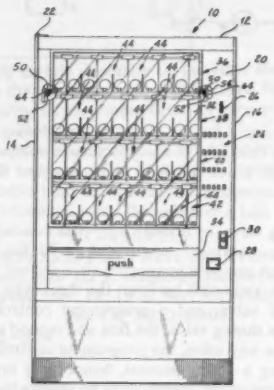
means associated with said opening tab means to direct said externally applied force to a location in the vicinity of said separable region, so that said force is applied to initiate the separation of said separable region.

4,023,704

HELICAL FEED MERCHANDISING MACHINE

Irving Pitel, Edison; Richard S. Silverman, Springfield, and Richard J. Mueller, Mountain Lakes, all of N.J., assignors to Rowe International Inc., Whippany, N.J.

Filed Mar. 25, 1974, Ser. No. 454,118
Int. Cl.² G07F 11/36
U.S. Cl. 221—75 15 Claims



1. A merchandising machine including in combination, a cabinet, a plurality of shelves, a plurality of merchandise delivery units on each of said shelves, means mounting said shelves in said cabinet in superposed relationship with the forward edges thereof spaced rearwardly of the front of said cabinet, said delivery units adapted to be actuated to deliver articles over the forward edges of said shelves, a plurality of flexible fingers, and means mounting said fingers respectively over said units with free ends thereof extending downwardly in front of the associated unit, the said units being vertically aligned and the length of said fingers being such that the free end of a finger associated with a unit on a lower shelf extends downwardly over the forward edge of the lower shelf to prevent an article delivered by an upper shelf unit from striking the forward edge of said lower shelf.

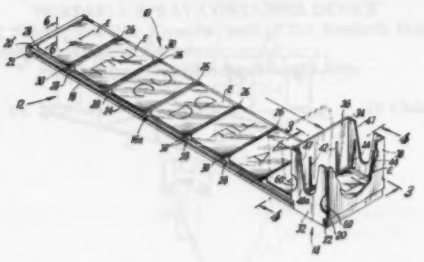
4,023,705

DISPENSER FOR CARDS AND THE LIKE

Lawrence L. Reiner, Woodbury, N.Y., and John P. McNett, Short Hills, N.J., assignors to Lawrence L. Reiner, Woodbury, N.Y.

Filed Apr. 10, 1975, Ser. No. 566,808
Int. Cl.² A24F 15/04
U.S. Cl. 221—186 16 Claims

1. Device for successively dispensing flat cards from one end of a stack of equally sized cards each having a predetermined thickness, comprising hopper means having a dispensing opening and internal dimensions to substantially correspond to the planar configuration of the cards and to perit the end cards of a stack disposed within said hopper means to successively pass therethrough with clearance; an elongate card receiving track which includes a plurality of in-line adjacently disposed card-receiving means including wall portions substantially transverse to the in-line direction of said track and which define a depth equal to approximately said predetermined thickness and dimensioned to receive only a single card therein, whereby relative movement of said hopper means with respect to said track to positions to bring said dispensing opening into registry with one of said card-receiving means causes an end card of a stack to drop out of said opening and into a respective card-receiving means, and whereby movement of said hopper means over successive ones of a series of adjacent card-receiving means causes a corresponding number of end-cards of the stack to drop into



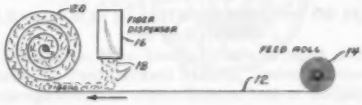
the respective card-receiving means with which said opening is brought into registry, the cards received within said card-receiving means being inhibited from inadvertently leaving the same by the retaining action of said transverse wall portions, said track having an upper surface and said wall portions being spaced from each other along said upper surface to define a plurality of in-line co-planar surfaces, and further comprising a groove in each co-planar surface parallel to and adjacent to an associated wall portion, whereby said grooves do not permit accumulation to form at said wall portions which may effectively reduce the heights of said wall portions substantially below said predetermined thickness.

4,023,706

METHOD OF PREPARING FIBROUS CONCRETE

William E. Dearlove, Washington, and Frederick S. Engelking, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed July 11, 1975, Ser. No. 595,073
Int. Cl.² B65B 9/00; E04C 5/01
U.S. Cl. 222—1 4 Claims



1. A method of mixing fiber reinforced concrete without the formation of fiber balls therein, comprising the steps of:

a. depositing a uniform layer of randomly oriented substantially individual concrete reinforcing fibers on an elongated web;

b. coiling the web so as to contain the fibers within the convolutions of the web, the fibers being otherwise unattached to the web;

c. locating the coiled web in proximity to a concrete mixing device;

d. progressively uncoiling the web at a predetermined rate to discharge the layer of fibers therefrom to progressively deposit the fibers in said mixing device; and

e. mixing the deposited fibers with concrete ingredients in the mixer.

4,023,707

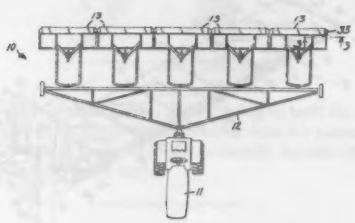
SEEDER WITH SEED FLOW MODIFICATION FOR MARKING SEEDED FIELDS

LeRoy E. Johnson, P.O. Box 6, Stanley, N. Dak. 58784

Division of Ser. No. 339,353, March 8, 1973. This application May 9, 1975, Ser. No. 575,932

Int. Cl.² A01C 7/08

U.S. Cl. 222—1 15 Claims



7. In a grain drill or the like having a plurality of closely spaced seeding units and means for providing a flow of seed through said units, the improvement in field marking apparatus comprising means actuated by motion of said drill over the ground for automatically changing, at periodic intervals, the flow of seed through one of said seeding units.

4,023,708

SAFETY DEVICE FOR WATER SUPPLY LINE OF A WASHING MACHINE

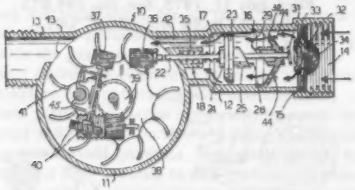
Paolo Fornasari, Casale Monferrato (Alessandria), Italy, assignor to Libero Elettrotecnica, Casale Monferrato (Alessandria), Italy

Filed Sept. 16, 1976, Ser. No. 723,823

Claims priority, application Italy, Feb. 27, 1976, 67472/76

Int. Cl.² B67D 5/30

U.S. Cl. 222—20 7 Claims



1. A safety device to regulate the volume of water flow to a washing machine, comprising a valve which is normally open, characterized in that said valve comprises a rotating disk firmly fitted to a small control shaft which is axially slidable against the action of a helical spring and formed by a plate with a first and a second hub portion in front of and behind the plate, respectively, in that the first hub portion is provided with at least one frontal tooth intended to engage, for a pre-established angular position of the plate, the corresponding notch of a location appendage which is integrally formed with the device body, and the second hub portion presents an adjustment surface suitable to cooperate with the corresponding surface of a fixed stop cap when the small shaft and the shutter are pushed to the rest position by the action of said helical spring; and that the tooth and the adjustment surface are angularly displaced with respect to the notch of the location appendage of the same angle.

4,023,709

APPARATUS FOR DOSING A CONSTANT QUANTITY OF FLUID INTO AN ANALYSIS DEVICE

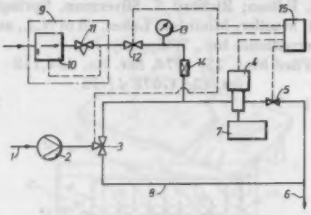
Wolf-Jürgen Becker, and Werner Magerkorth, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 8, 1976, Ser. No. 703,400

Claims priority, application Germany, July 31, 1975, 2534260

Int. Cl.² B67D 5/08

U.S. Cl. 222—70 2 Claims



1. An apparatus for the discontinuous dosing of a constant quantity of a fluid into an analysis device, comprising a dosing valve through which the fluid to be analysed flows, a three-way valve connecting an inlet for the fluid either through the dosing valve and a first shut-off valve connected downstream of the dosing valve, or through a by-pass conduit, to an outlet for the fluid, a source of compressed gas for the production of a constant gas pressure connected via a second shut-off valve to a conduit connected between the three-way valve and the first shut-off valve, and a programme control device connected to the dosing valve, the first and second shut-off valves and the three-way valve, the programme control device, when in use, during a dosing process, temporarily interrupting the fluid flow through the dosing valve by closing the first shut-off valve and switching the three-way valve to the by-pass conduit and connects the source of compressed gas to the conduit between the three-way valve and the first shut-off valve, so that the quantity of fluid contained between the three-way valve and the first shut-off valve is under the gas pressure during the dosing process, whereafter the second shut-off valve is closed and the fluid flow through the dosing valve is resumed.

4,023,710

PRESSURE PACK VALVE FOR DISPENSING PARTICULATE MATERIALS

David John Alexander, Twickenham, and Rustom Kooverji Gamadia, London, both of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 366,885, June 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 292,041, Sept. 25, 1972, abandoned. This application Sept. 17, 1974, Ser. No. 506,929

Claims priority, application United Kingdom, Sept. 29, 1971, 45282/71; June 8, 1972, 26700/72

Int. Cl.² B65D 83/14; F16K 31/58

U.S. Cl. 222—148 6 Claims

1. A valve for a pressurized pack which comprises:

a. a valve housing defining an intermediate chamber;

b. a mounting flange for mounting the housing in the pressurized pack;

c. an elastomeric gasket separating the interior of the pack from the atmosphere, the gasket being sandwiched between the housing and the mounting flange and being formed with an aperture;

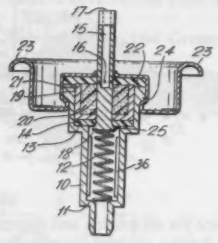
d. a valve stem having a hollow discharge end and an outlet orifice communicating said discharge end with the chamber when the valve is open, the valve stem being movable

in the chamber through the aperture formed in the gasket from an open position to a closed position at which the gasket acts to seal the outlet orifice;

e. a valve spring acting against the stem to urge it into the closed position;

f. an annulus of open celled resilient foam material located in the housing and surrounding the valve stem, the annulus being slightly undersize on the valve stem and serving to wipe the valve stem and apply a liquid film to the valve stem during its movement between open and closed positions; and,

g. a secondary elastomeric gasket in sealing engagement with the valve stem at a position inwards of the first gasket.



4,023,711

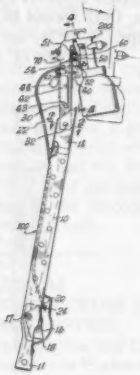
EXTENSION ARM FOR PAINT SPRAYING DEVICES

Ernest H. Sena, 510 1/2 S. Magnolia, Monrovia, Calif. 91790

Filed Nov. 18, 1975, Ser. No. 632,965

Int. Cl.² B05B *15/06*

U.S. Cl. 222—174 **7 Claims**



1. An extension arm for a spray painting device having a grip comprising:

an elongated stock, incorporating a pivotably mounted operating lever near one end thereof;

a locking receptacle attached to the other end of said stock, for receiving the spray device grip, said receptacle being defined by a stationary plate and a pivotable plate.

adjusting means for changing and securing angular relationship between said stock and said receptacle; and

actuating means, including a projecting finger for engaging the control trigger of a paint spraying device received in said receptacle, spring means biasing said finger into the inoperative position of said control trigger, and sheathed, flexible cable means operably interconnecting said finger and said operating lever,

whereby manually induced displacement of the operating lever is transmitted by said cable means to said finger and causes said control trigger to displace into the operative position, thereby initiating paint spray dispensing action of the paint spraying device.

4,023,712

PORTABLE SPRAY CONTAINER DEVICE

Ihor Babiak, and Ihor Klymciw, both of 215 Renforth Drive, Etobicoke, Ontario, Canada

Filed Jan. 27, 1976, Ser. No. 652,886

Int. Cl.² B67D *5/64*

U.S. Cl. 222—175 **10 Claims**

1. A portable spray container device comprising:

a. a pressurized container having a spray outlet and containing a spray composition and a propellant;

b. a covering cap releasably attached to the pressurized container and covering the spray outlet to prevent accidental discharge of the pressurized container; and

c. a pendant means attached to the covering cap for suspending the portable spray container from a suspending means;

whereby when the pressurized container is pulled, the covering cap is released from the pressurized container uncovering the spray outlet for use and the cap remains suspended from the suspending means thereby preventing loss of the cap.

4,023,713

APPARATUS FOR BATCHWISE FEEDING OF POWDERS OR PARTICLES

Karl Brotzmann; Hans Georg Fassbinder, both of Sulzbach-Rosenberg; Paul Gerhard Mantey, Amburg; Johann Claus Grapengiesser, and Alfred Hansen, both of Hamburg, all of Germany, assignors to Eisenwerk-Gesellschaft Maximilianshutte mbH, Sulzbach-Rosenberg, Germany

Continuation of Ser. No. 447,418, March 1, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,538

Claims priority, application Germany, Mar. 2, 1973, 2310358

Int. Cl.² B67D *5/54*

U.S. Cl. 222—193 **19 Claims**

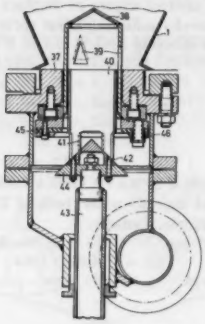
1. Apparatus for batch wise feeding of particles or powders from a pressurized supply container with a sealable discharge orifice comprising:

a movable sealing and metering body;

a sealing means mounted downstream of said sealing and metering body;

a chamber wherein said sealing means is seated, wherein said chamber encloses an axially movable cylinder (19) mounted in said chamber surrounding a push rod (7) and

equipped with an external displacement drive (23, 24, 25) means to move said cylinder axially;



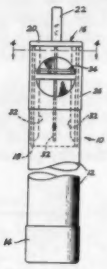
said push rod supporting said sealing and metering body at its upstream end.

4,023,714

SHAKABLE DISPENSING DEVICE

Samuel D. Klemek, 1 Holman Road, Carmel Valley, Calif. 93924

Filed Mar. 29, 1976, Ser. No. 671,277
Int. Cl.² B65G *65/70*
U.S. Cl. 222—196.1 **4 Claims**



1. A dispensing device for powdered or granular material such as fertilizer which includes, in combination,

a. a first unit comprising a reservoir member of uniformly circular cross-section at the discharge end thereof and closed at the opposite end,

b. a second unit that includes

b1. a second tubular member of uniform, circular cross-section that fits snugly for a substantial distance into the unclosed end portion of the first unit and projects for a substantial distance outward beyond the discharge end of the first unit, is frictionally secured thereto, and has a dispensing opening in one side thereof,

b2. a closure portion for the free end of the second tubular member that includes a protruding flange and

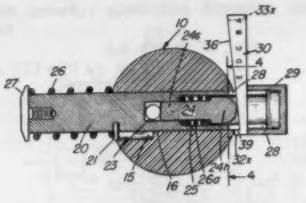
c. a sleeve rotatively fitted on the second tubular member between the reservoir member and the flange of the second tubular member, and having a lateral discharge opening which, through rotation of the sleeve, may be set to expose all or any desired part of the dispensing opening of the second tubular member.

4,023,715

MEASURING AND DISPENSING DEVICE

Joseph G. Biondo, Watchung, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Filed Sept. 2, 1975, Ser. No. 609,283
Int. Cl.² G01F *11/10*
U.S. Cl. 222—307 **8 Claims**



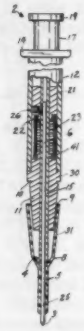
1. In a device for measuring and dispensing flowing materials, a casing having an inlet port and a discharge port for inflow and discharge of the material, a measuring and dispensing member slidable in a passageway in said casing, said member having a longitudinally extending passage one end of which comprises a measuring chamber, said member including openings for connecting said ports with said chamber, a valve member mounted for rectilinear slidable movement in said longitudinal passage to vary the volume of said measuring chamber, a separate member engaging said valve member and movable in a direction transverse to the direction of movement of said valve member and manually operable in one direction to decrease the volume of said chamber, and means biasing said valve member to increase the volume of said chamber as said manually operable member is moved in an opposite direction.

4,023,716

MICRO-DISPENSING LIQUID PIPET

Justin Joel Shapiro, 1802 Second St., Berkeley, Calif. 94710

Filed Apr. 20, 1976, Ser. No. 678,481
Int. Cl.² B01L *3/02*
U.S. Cl. 222—309 **9 Claims**



1. A pipet comprising a main barrel provided with an axial operating shaft slidably engaged in the barrel, a dispensing tip yieldably connected to said main barrel, said dispensing tip comprising a yieldable barrel-coupling portion and a conduit portion, a plunger operatively engaged in said conduit portion, means coaxially connecting said plunger to said shaft, whereby the plunger can be reciprocated by reciprocating said shaft, and means to disengage said barrel-coupling portion from the barrel at times responsive to axial force exerted on said shaft, wherein said tip includes annular internal shoulder means, wherein said disengaging means comprises abutment means moving with said shaft and being engageable with said

shoulder means to transmit said axial force, and wherein said abutment means is engageable with said shoulder means to normally limit the discharge movement of said plunger in said conduit portion.

4,023,717

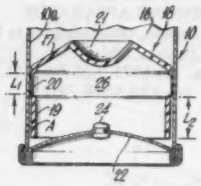
PRESSURE-OPERATED CONTAINER FOR VISCOUS PRODUCTS

Robert S. Schultz, 7 Heusted Drive, Old Greenwich, Conn. 06870

Continuation-in-part of Ser. No. 459,328, April 9, 1974, abandoned. This application Sept. 24, 1975, Ser. No. 616,363

Int. Cl.² B67D *5/54*

U.S. Cl. 222—386.5 **37 Claims**



28. In combination, a pressure container comprising an elongate cylindrical body with a closed upper end, dispensing-valve means in said upper end, a piston having a closed upper end and integral body structure extending downwardly within a cylinder spaced from the container wall, said piston including a peripherally continuous relatively thin flexible tubular band integrally uniting and axially spacing said upper end from said downwardly extending body structure, said tubular band being of axial extent substantially exceeding its radial thickness and in light peripherally continuous piston-piloting and sealing contact with the container wall, and said upper end and downwardly extending body structure each being of peripheral extent less than the peripheral extent of the inner wall of said container, whereby a product chamber is defined in the container space between the piston band and the valved end of the container, and pressure-sealing means closing the lower end of said container to define a pressure chamber beneath said piston, and further whereby when said product chamber is loaded with product and the lower end of said container is subjected to a charge of gas under pressure said band will be pressure-loaded in the direction of enhanced sealing contact with the container wall.

4,023,718

SEALING AND CLOSURE STRUCTURE FOR A SPRAY DISPENSING DEVICE

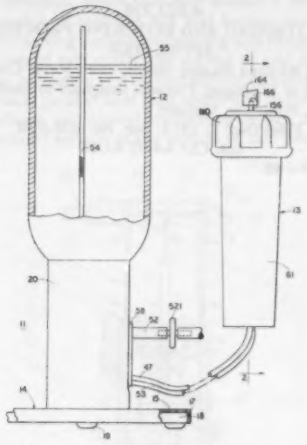
Arthur W. Forbriger, Indian Hill, Ohio, and Carl E. Meyerhoefer, Little Neck, N.Y., assignors to Revlon-Realistic Professional Products, Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 458,107, April 4, 1974, abandoned. This application Mar. 14, 1975, Ser. No. 558,346

Int. Cl.² B65D *83/00*

U.S. Cl. 222—399 **19 Claims**

5. A dispensing device for a bottle which comprises an annular cap threaded on a neck of the bottle, the cap having an inwardly directed flange overlying the neck of the bottle, a plug mounted inside the neck, there being a spout on the plug communicating with the interior of the bottle, a fitting assembly mounted inside the neck of the bottle between the flange and the plug, the fitting assembly having a central socket receiving the spout, a first O-ring seal between the fitting assembly and the neck of the bottle, a second O-ring seal between the spout and a wall of the socket, means connected to the socket for receiving liquid from the bottle, a tube mounted on the plug spaced from the spout and extending into the bottle, there being an opening in the fitting assembly spaced from the socket and connected to the tube, and means



for directing air under pressure through the opening and the tube to cause flow of liquid from the bottle through the spout.

4,023,719

HOPPER CLOSING AND EMPTYING DEVICE

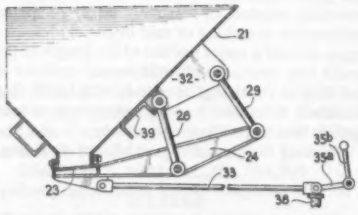
Gustave Maurice Noyon, Paris, France, assignor to Societe Internationale d'Investissements et de Participations (Interpar), Paris, France

Continuation-in-part of Ser. No. 504,836, Sept. 10, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 629,991

Claims priority, application France, Sept. 12, 1973, 73.32744

Int. Cl.² B65G *65/62, 65/66*

U.S. Cl. 222—505 **9 Claims**



1. A device for opening and closing a hopper, said hopper having a lower discharge opening and an oblique lateral wall, said device comprising:

a support located under said oblique wall and said lower discharge opening;

a door attached to said support adjacent one end of said support;

a fixed frame attached to said oblique wall;

two links comprising the sole means for suspending said support, one end of each of said links connected to said fixed frame to pivot about a first and second axis, and an opposite end of each of said links connected to said support to pivot about a third and fourth axis; and

an actuating and locking mechanism connected to said support and located on the same side of the hopper with respect to said discharge opening as is the fixed frame, the disposition of said one end of the support and said third and fourth axis being such that the said one end of the support is remote from the third and fourth axis and lines

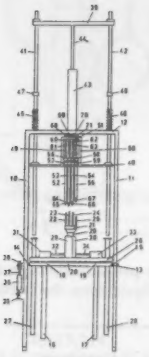
connecting the third axis, the fourth axis, and the said one end of the support define a triangle.

4,023,720

GLOVE TURNING AND BLOCKING PROCESS AND APPARATUS

Colin Filko; Richard Stanley Smith, and Lawrie Gandier McIntosh, all of Winnipeg, Canada, assignors to Sterling Glove Co., Ltd., Winnipeg, Canada

Filed Dec. 1, 1975, Ser. No. 636,590
Int. Cl.² A41H *43/00*
U.S. Cl. 223—40 **18 Claims**



1. A process of simultaneously turning and blocking at least one finger of a glove of leather or similar material, which comprises:

mounting a stitched glove with said at least one finger thereof in an inside-out condition over a finger mounting member of relatively small diameter, the stitched seams of the glove finger being presented outwardly;

turning the glove finger to its right side out condition and simultaneously pressing said stitched seams, by rolling said glove finger onto a heated exterior surface of a finger receiving mandrel of relatively larger diameter with simultaneous stretching of said finger;

bringing at least a major portion of the length of the stitched seams into contact with said heated exterior surface of the finger receiving mandrel with said finger in a stretched condition so as to press said stitched seams against said heated exterior surface;

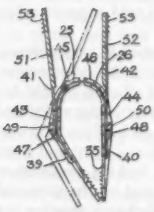
and removing the glove from said finger receiving mandrel.

4,023,721

GARMENT CLAMPING HANGER WITH SPRING-BIASED CLAMPING MEMBERS

Marc Erthein, Newberry Road, East Haddam, Conn. 06423

Filed Sept. 25, 1975, Ser. No. 616,847
Int. Cl.² A47J *51/14*
U.S. Cl. 223—96 **6 Claims**



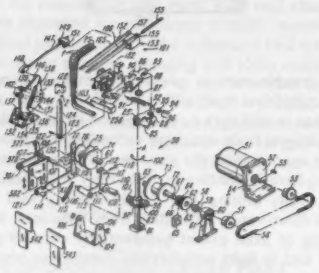
1. A plastic garment hanger comprising an arm carrying at least one clamp integrally molded therewith, said clamp having first and second hinged gripping members of limited resiliency below the hinged area, one of said gripping members being in diverging relationship with the other at least adjacent the top, said gripping members being adapted for movement between a closed and locked article gripping position and an article releasing position, a spring clip having legs extending therefrom and in overlying engagement with said gripping members, means for nonslideable securing said clip and legs at opposite sides to each of said gripping members to hold said gripping members together in normally closed and locked position, and finger engageable means extending from each of said legs to separate each of said gripping members to an article releasing position against the compressive force of the clip.

4,023,722

PINNING APPARATUS

Harold N. Grushon, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Dec. 18, 1975, Ser. No. 641,843
Int. Cl.² B27F *7/02*
U.S. Cl. 227—25 **14 Claims**



1. Apparatus for pinning tags to merchandise and including means for feeding a tag into position to be pinned onto merchandise, means for holding a tag and merchandise together in bent orientation, means for driving a pin through the tag and merchandise to pin the tag and the merchandise together, and means for moving the tag feeding means, the improvement residing in the moving means which includes a drive pin, means for driving the drive pin in a circular path, and a follower having an elongated slot in which the drive pin is received.

4,023,723

APPARATUS FOR BREAKING STRIPS FROM PLATES, PARTICULARLY FROM PLATES OF CHEWING GUM

Werner Dämmig, Furth, Germany, assignor to Maschinenfabrik Loesch GmbH, Forchheim, Germany

Filed June 27, 1975, Ser. No. 591,068
Claims priority, application Germany, July 12, 1974, 2433547
Int. Cl.² B26F *3/00*
U.S. Cl. 225—97 **4 Claims**

1. Apparatus for breaking off strips from the leading edge portion of an advancing plate, for instance of chewing gum, along succeeding transversally extending, longitudinally equally spaced lines of weakness performed in at least one face of the plate, comprising:

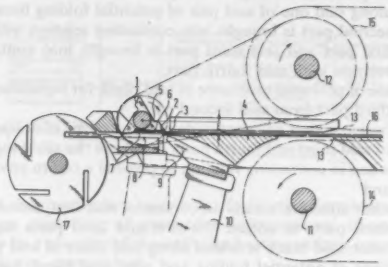
a stationary plate support surface having a transversally extending leading edge;

means for continuously advancing the plate along the support surface to displace more of the leading edge portion of the advancing plate past the leading edge of the support surface;

a single rotating breaker shaft which is generally polygonal

in transverse cross-section, so as to have a plurality of side faces interspersed angularly of the shaft with a plurality of breaker edges, the shaft being disposed in proximity to the leading edge of the support surface so that, as the shaft rotates a nip is periodically formed between the leading edge of the support surface and succeeding edges of the breaker shaft;

each breaker shaft side face having a stop defined by a recess between successive breaker edges, the distance between each stop and a respective rotationally trailing breaker edge being substantially equal to the width of each strip to be broken from the advancing plate;



the axis of rotation of the breaker shaft being so transversally displaced from the level of the leading edge of the support surface as to produce the following relation:

as the leading edge of the plate engages a respective stop and the rotationally trailing breaker edge produces a nip with the leading edge of the support surface resulting in the shearing of the plate along the respective performed line of weakness of the plate, this breaker edge has a velocity component in the longitudinal direction of the advancing plate that is approximately as large as the velocity of the advancing plate; and

means for removing the successively formed strips from the vicinity of the breaker shaft.

4,023,724

SOLDER REMOVING BIT

Katumasa Wakita, Yokohama; Issei Yunoki, and Mitunari Yoshida, both of Tokyo, all of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Division of Ser. No. 468,368, May 9, 1974, Pat. No. 3,963,897, which is a division of Ser. No. 289,562, Sept. 15, 1922, Pat. No. 3,842,240. This application Nov. 17, 1975, Ser. No. 632,860

Claims priority, application Japan, Sept. 17, 1971, 46-84514[U]; Oct. 4, 1971, 46-91013[U]; Jan. 13, 1972, 47-6428[U]; Sept. 27, 1971, 46-75310

Int. Cl.² B23K *3/02;* **H05B** *1/00*

U.S. Cl. 228—20 **3 Claims**

1. A solder removing bit for use in removing melted solder, comprising:

a bit body;

said bit body having a rear end; a suction pipe opening at said rear end of said bit body;

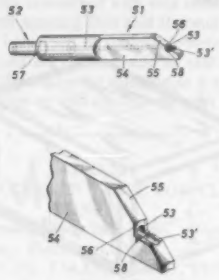
said bit body having a front end opposite its said rear end; said bit body having a front end portion adjacent said front end; at said front end portion, said bit body having flat, parallel, side surfaces;

said bit body having a top and an opposite bottom surface extending along said bit body and extending between said front end portion side surfaces;

at said front end, said bit body comprising a generally inclined connecting surface that is inclined with respect to said top and said bottom surfaces and that extends between said side surfaces;

a suction bore passing through said bit body from said suction pipe opening through said inclined surface;

a notch cut into said inclined surface and spaced from said top and said bottom surfaces; said notch being defined by two mutually intersecting surfaces which meet at an intersection; the first of said intersecting surfaces extending in a first direction, which direction intersects the direction of extension of said top and said bottom surfaces; said first intersecting surface intersecting said inclined surface at the top of said notch; the second of said intersecting surfaces extending in a second direction, which direction is generally parallel to at least one of said bottom and said top surfaces; said second intersecting surface intersecting said inclined surface at the bottom of said notch;



said intersection of said first and second surfaces extends across and through said suction bore to provide a solder entrance opening into said bore, such that said suction bore extends beneath said second surface; a suction bore notch formed in said second surface; said suction bore notch corresponding in cross-section and direction of extension to the portion of the cross-section of said suction bore that is below said intersection and below said second surface, whereby said suction bore remains unblocked.

4,023,725

SEMICONDUCTOR DEVICE MANUFACTURE

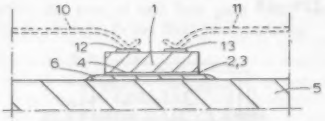
Peter Robert Ivett, Southampton; Christopher Tooth, Cornwall, and Leslie Charles Davis, Southampton, all of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1975, Ser. No. 554,969

Claims priority, application United Kingdom, Mar. 4, 1974, 9689/74

Int. Cl.² B23K *1/02;* **H01L** *21/58*

U.S. Cl. 228—123 **10 Claims**



1. A method of mechanically, electrically and thermally bonding the back face of a semiconductor body to a supporting member, comprising the steps of:

evaporating a thin layer of chromium onto the back surface of the semiconductor body;

evaporating onto the chromium layer a thin layer of metal selected from the group consisting of rhodium, platinum, palladium and alloys thereof;

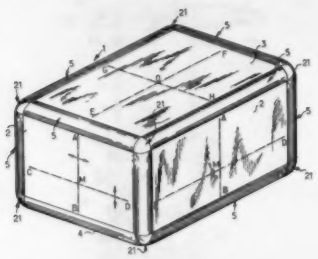
fusing the metallized back surface of the semiconductor body to the supporting member with a solder film.

4,023,726

METHOD OF MAKING A SEMI-MEMBRANE LIKE CONTAINER AND BUILDING A HEAT INSULATED FLUID TIGHT TANK EMBODYING THE SAME

Jean-Louis Gilbert Massac, Meudon, France, assignor to Gazocean, Paris, France

Division of Ser. No. 570,178, April 21, 1975, Pat. No. 3,998,350. This application Apr. 30, 1976, Ser. No. 682,190
Claims priority, application France, Apr. 25, 1974, 74.14478
Int. Cl.² B23K 31/02
U.S. Cl. 228—184 5 Claims



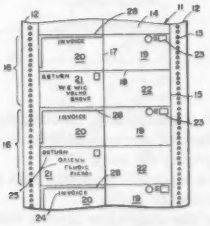
1. A method of making an inner container with vertical side walls for a tank comprising the steps of: providing component metal sheet parts with shaped marginal elements, providing curved plates and shaping said plates simultaneously while positioning said plates in stacked superposed relationship with respect to said marginal elements, assembling and welding together componenet metal sheet parts and plates on assembly jigs to provide pre-fabricated sub-assemblies; controlling the quality of the assembly welds, connecting each curved plate to adjacent marginal elements before positioning and welding the next curved plate to the marginal element of a said part, building pre-fabricated container block units comprising a bottom unit and at least one sectional component forming an intermediate body unit with dihedral angles defined by intersecting projections of said sheet parts, inserting lubricating stuffing between stacked assembled curved plates, heat treating the middle portions of the curved plates to provide differential tight fits of said stacked curved plates providing adjusting packing strips at said dihedral angles and welding the said pre-fabricated units to each other while adjusting the dihedral angles thereof by said adjusting packing strips.

4,023,727

MAILING ENVELOPE STRUCTURE AND METHOD

Thomas H. Tess, Green Bay, Wis., assignor to Shade Information Systems, Inc., Green Bay, Wis.

Filed Jan. 26, 1976, Ser. No. 652,504
Int. Cl.² B65D 27/10, 27/06
U.S. Cl. 229—69 6 Claims



1. A mailing envelope structure comprising a generally rectangular web blank having a pair of mutually perpendicular lines of potential folding to divide said blank into four parts and to provide each part with two exterior edges and two interior edges,

a first of said parts being equipped with outgoing envelope indicia printed thereon,

a second of said parts constituting a recipient information part and being separated from said first part by one of said pair of lines of potential folding,

a third of said parts being equipped with return envelope indicia printed theron and being diagonally related to said first part,

a fourth of said parts constituting an envelope back separated from said first part by the other of said pair of lines of potential folding whereby when said blank is folded along said one of said pair of potential folding lines, said second part is brought into contacting relation with said first part and said third part is brought into contacting relation with said fourth part,

a line of potential severance in said blank for separating said third part from said second part,

adhesive means adjacent certain of the edges of at least one of said third and fourth parts ot adhere the same together when in contacting relation to provide a return envelope, and

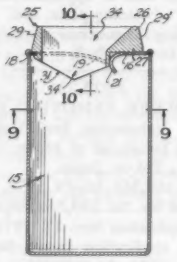
further adhesive means on certain of said first, second and third parts to adhere the first and third parts together when said blank is folded along said other of said pair of lines of potential folding and after said blank has been previously folded along said one line.

4,023,728

COIN SLOT FOR FLIP TOP CAN

William Gamberg, 5506 Dent Ave., San Jose, Calif. 95118

Filed Jan. 22, 1976, Ser. No. 651,552
Int. Cl.² A47G 29/00
U.S. Cl. 232—4 R 4 Claims



1. A coin slot and a flip-top can having an opening formed in its top, said opening having its widest dimension at a lip edge of the can top adjacent the rim bead of such can and side edges extending toward a reduced terminal edge adjacent the center of the can top; said coin slot comprising a coin slot body including:

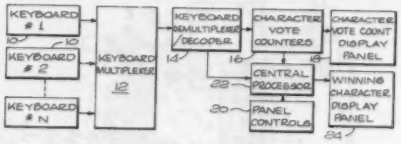
1. a cap member having a base of a length comparable to the diameter of the can top and a width sufficient to cover the widest dimension of the opening formed therein, said cap member having a coin slot formed lengthwise thereof from its top to the bottom of its base;
2. a wedge-shaped extension extending downwardly from the base of said cap member of a width and length sufficient to form a border around a passage sufficient to pass the largest coin therethrough, and having such a passage in communication with the coin slot formed through said cap member;
3. said extension having one end thereof inset slightly from one end of said cap member and provided with a bead spaced from the lower surface of said base to form a fulcrum groove for receiving the lip edge of the opening in the can top, to provide for fulcrumed lever action by

said cap member upon manual depression of the latter toward the can top, and said extension including means for fracturing the terminal edge of said opening upon said manual depression of said cap member.

4,023,729
GROUP COMMUNICATIONS SYSTEM

Roger W. Eaton, 807 N. HyPerion Ave., Los Angeles, Calif. 90029

Filed Oct. 15, 1975, Ser. No. 622,557
Int. Cl.² G07C *13/00*
U.S. Cl. 235—52 **10 Claims**



1. A communication system for facilitating formation of a message consisting of successive informational characters chosen by a plurality of the individual voting entities constituting a group, comprising:

a plurality of keyboard selector units operable during each polling interval to manifest any one of a variety of coded output signals indicative of a selected informational character;

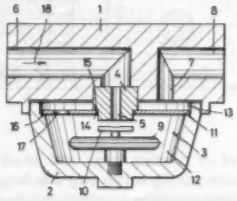
a plurality of vote counting means each responsive to a respective one of said coded output signals for registering a vote total indicative of the number of voting entities selecting the associated informational character during a polling interval; and, winning vote detecting means responsive to a sequential comparison of the vote totals accumulated in each said counting means upon termination of each polling interval for detecting the informational character selected by a predetermined plurality of said voting entities during the preceding polling interval; and

means for selectively signaling the termination of each polling interval to initiate the operation of said winning vote detecting means.

4,023,730
STEAM TRAP

Föller Werner, Stuhr, Germany, assignor to Gestra-KSB Vertriebsgesellschaft mbH & Co. Kommanditgesellschaft Bremen, Bremen, Germany

Filed Aug. 27, 1975, Ser. No. 608,121
Claims priority, application Germany, Oct. 2, 1974, 2447031
Int. Cl.² F16T *1/04*
U.S. Cl. 236—58 **6 Claims**



1. A steam trap comprising:

a housing forming a low pressure chamber and having an inlet and outlet openings thereto, said low pressure chamber being adapted to be filled with condensate;

a valve seat formed at the inlet opening of said low pressure chamber;

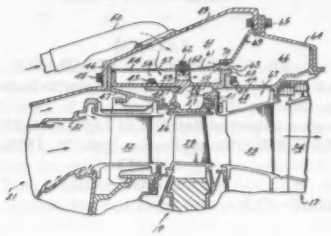
thermal control means filled with an expansion medium and disposed in said low pressure chamber, said control means being completely immersed in the condensate and including a locking member for actuation by said thermal control means cooperating with said valve seat; and

a separating wall independant of said thermal control means dividing said low pressure chamber into two chambers, said separating wall having a porthole, one of said two chambers being connected to said inlet opening and containing said control means, the other of said two chambers being connected with said outlet opening, said separating wall assuring that said thermal control means is constantly immersed in the condensate, said porthole being positioned on another side of said control means with respect to said outlet opening in a radial and axial direction relative to said control element.

4,023,731
THERMAL ACTUATED VALVE FOR CLEARANCE CONTROL

William R. Patterson, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 534,551, Dec. 19, 1974, Pat. No. 3,966,354. This application Oct. 29, 1975, Ser. No. 626,862
Int. Cl.² G05D *23/02*
U.S. Cl. 236—93 R **6 Claims**



1. A thermal valve responsive to the temperature of a fluid to which it is exposed comprising:

a. a first ring having a relatively low thermal coefficient of expansion;

b. a second ring axially spaced from and relatively fixed with respect to said first ring and having a specified diameter and a relatively low thermal coefficient of expansion; and

(c) a cylinder having a relatively high thermal coefficient of expansion and a diameter different from that of said second ring, said cylinder having its one end rigidly connected to said first ring and its other end axially overlapping a portion of said second ring and radially spaced therefrom to mutually define a flow path having an inlet and outlet, the area of said flow path being variable in response to changes in the fluid temperatures.

4,023,732
ELEVATOR RAIL CLAMP

Edmond J. Mathis, c/o Asheville Elevator Co., Inc., P.O. Box 5863, Asheville, N.C. 28803

Filed Mar. 3, 1975, Ser. No. 554,720
Int. Cl.² E10B *9/00*
U.S. Cl. 238—338 **3 Claims**

1. Apparatus for clamping an elevator rail or the like to a building frame wherein the rail is substantially T-shaped in cross section with a horizontal section and a vertical section, the combination of

a clamp having

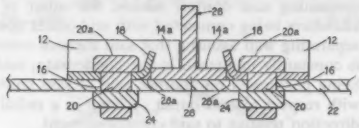
a base having

two spaced longitudinal flanges extending substantially vertically therefrom,

said flanges extending beyond said base to form cut-out portions with bottom horizontal edges adapted to fit over the top of said horizontal section of said rail,

the inner end portion of said cut-out portion adapted to fit against the edge of said rail,

said base having a hole receiving a standard bolt which may extend therethrough and through a hole in said building frame,



said standard bolt having

a head with a plurality of flat surfaces

the dimensions of said head and of the space between said longitudinal flanges being such that two of said surfaces substantially engage the inside surfaces of said longitudinal flanges when the bolt is inserted in the clamp,

whereby said bolt is held against rotation in said clamp when a nut is screwed thereon and said clamp is held against rotation by the edge of said rail during tightening.

4,023,733

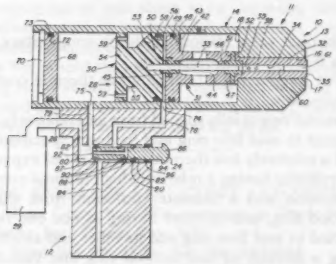
FOAM DISPENSING APPARATUS

Charles R. Sperry, Wilton, Conn., assignor to Instapak Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 517,892, Oct. 25, 1974, Pat. No. 3,945,569. This application Sept. 26, 1975, Ser. No. 617,042

Int. Cl.² B05B *15/02*

U.S. Cl. 239—112 **1 Claim**



1. In an apparatus for mixing and dispensing a plurality of liquids having a housing means, a mixing chamber in said housing means having an outlet at its forward end and a plurality of entrance ports upstream of said outlet and each entrance port for introducing fluid into said chamber, a movable valving rod for opening and closing said entrance port, means for moving said valving rod from a forward or extended-position to rear or retracted-position away from said forward end, and a reservoir adapted to hold material for cleaning said rod when in said retracted position, said rod having a reduced cross-sectional portion intermediate the ends thereof having a portion with a flat side, said flat side being positioned in said reservoir when the rod is in said retracted-position and out of the reservoir and within the mixing chamber when the rod is in the extended position, the improvement comprising:

said entrance ports being positioned opposed and axially offset from each other.

4,023,734

METHOD AND APPARATUS FOR COMMUNITING MARINE ALGAE AND THE RESULTING PRODUCT

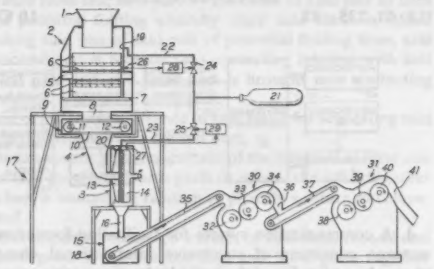
Rene A. Hervé, les Tertres, Pluduno, 22130 Plancoet, and Daniel L. Rouillier, Beauregard, 35, Saint-Meloir-les-Ondes, both of France

Filed Oct. 15, 1975, Ser. No. 622,637

Claims priority, application France, Oct. 18, 1974, 74.35162

Int. Cl.² B02C *23/18*

U.S. Cl. 241—17 **5 Claims**



1. The method for producing algae pulp, the mean size of the particles in which is less than 100 micrometers, comprising:

freezing fresh algae at a temperature of less than −20° C;

feeding said frozen algae into a comminuting assembly;

comminuting said frozen algae while maintaining within said comminuting assembly a temperature lying within the range −30° to −100° C;

continuously feeding the solid fragments of comminuted algae obtained at the output of said comminuting assembly into roller size reducer means; and

crushing said fragments at ambient temperature whereby said fragments are crushed and warmed up to obtain said algae pulp at the output of said roller size reducer means.

4,023,735

APPARATUS AND METHOD FOR PROCESSING MEAT AND BONE PIECES

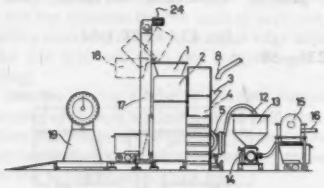
Karl Schnell, Muhlstr. 28, D-7065 Winterbach, Germany

Filed Mar. 8, 1976, Ser. No. 664,480

Claims priority, application Germany, Mar. 22, 1975, 2512742

Int. Cl.² B02C *23/10*

U.S. Cl. 241—22 **1 Claim**



1. A method of treating large and small bone meats and meat pieces, comprising subjecting the large and small bone meats to a coarse crushing in which the bones and meats are formed into smaller sizes of from 5 to 10 mm, subjecting the smaller sized bones, meat and meat pieces to a preliminary fine crushing to reduce the size further to from 0.5 to 1 mm, supplying ice and salt to the smaller-sized bones and meat and meat pieces which are subjected to a preliminary fine crush-

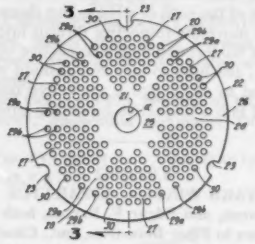
ing, thereafter, subjecting the reduced size meats to a final fine crushing to form it into a paste, and delivering the paste to a decanter for separating the bone and fiber parts from the meat parts.

4,023,736

CHOPPER PLATE

William C. Pattillo, Stone Mountain; Robert N. Lukat, Morrow, both of Ga., and Neils N. Engel, Sante Fe, N. Mex., assignors to Southern Saw Service, Inc., Atlanta, Ga.

Filed Apr. 29, 1976, Ser. No. 681,760
Int. Cl.² B02C 18/36
U.S. Cl. 241—82.5 11 Claims



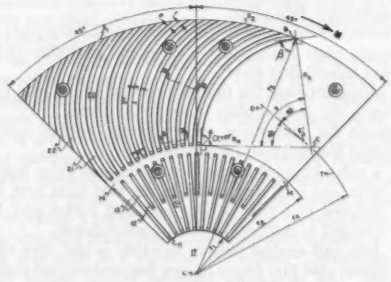
1. A chopper plate for meat grinder composed of a body having a planar surface for cooperating with the chopper knife of the meat grinder moved along said surface, said body having a plurality of perforate areas respectively provided with a plurality of spaced holes, and an imperforate area extending from the central portion of said body to the edge of said body between and separating said perforate areas, the distance between the adjacent holes of the respective perforate areas across said imperforate areas being greater than the distance between adjacent holes within said adjacent areas, and wherein said holes of each of said perforate areas are arranged in parallel rows on both sides of an adjacent imperforate area.

4,023,737

SPIRAL GROOVE PATTERN REFINER PLATES

Philip J. Leider, Columbia, Md., and Jorg Rihs, Hot Springs, Va., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,684
Int. Cl.² B02C 7/12
U.S. Cl. 241—261.3 8 Claims



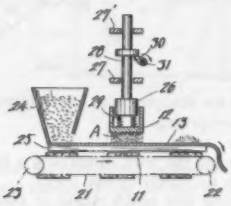
1. A pie segment of a fibrous stock refiner disc fabricated about an axis of revolution and having a serrated stock working face on one planar surface thereof, said face having a stock distribution groove segment of a circular ring developed about said axis and disposed radially between said axis and an outer peripherial boundary of said disc segment, serrations between said distribution groove and said outer boundary comprising an alternating series of curved bars and channels extending continuously from said groove to said outer boundary, each bar having substantially the same thickness at said groove as at said boundary and each channel being a substantially constant width arc of a first circle developed about a first center point located on the locus of a second circle, said second circle being developed about said axis of revolution.

4,023,738

APPARATUS FOR PRODUCING FINE IRON PARTICLES

Susumu Ogihara, and Yoshitomo Tezuka, both of Hachiohji, Japan, assignors to Aida Engineering, Ltd., Japan

Filed Jan. 22, 1976, Ser. No. 651,349
Claims priority, application Japan, Feb. 6, 1975, 50-14903
Int. Cl.² B02C 1/14
U.S. Cl. 241—271 6 Claims



1. An apparatus for producing fine iron particles comprising a member formed of at least one permanent magnet; another member formed of a magnetic material; said two members having mutually facing relationship to provide a magnetic field therebetween; a driving means operatively associated with said members for relatively moving them repeatedly toward and away from each other for crushing iron chips; and guide means for introducing iron chips between the two members.

4,023,739

LINING ELEMENT FOR PULP REFINERS

Väino Lampe, and Karl-Erik Johansson, both of Hagfors, Sweden, assignors to Uddeholms Aktiebolag, Hagfors, Sweden

Filed Apr. 5, 1976, Ser. No. 673,943
Claims priority, application Sweden, Apr. 9, 1975, 7504056; Sept. 8, 1975, 7509957
Int. Cl.² B02C 7/12
U.S. Cl. 241—296 6 Claims

1. In a pulp refining apparatus having a lining element, the improvement wherein the lining element is a casting of an alloy consisting essentially of from 1.0 to 5.0 percent by weight of titanium present as titanium carbide grains in a matrix of a steel containing from 0.4 to 2.2 percent by weight of carbon, a maximum of 2.0 percent by weight of silicon, a maximum of 2.0 percent by weight of manganese, a maximum of 0.03 percent by weight of phosphorus, a maximum of 0.03 percent by weight of sulphur, a maximum of 20 percent by weight of chromium, a mixmum of 20.0 percent by weight of nickel, a maximum of 6.0 percent by weight of molybdenum, a maximum of 10 percent of cobalt, a maximum of 1.5 percent by wt. of vanadium, the balance being essentially iron, said titanium carbide grains having a maximum average size of about 10 microns, said grains being substantially uniformly distributed throughout the steel casting with an average distance between neighboring grains of from about 3 to about 30 microns.

4,023,740
BOBBIN TERMINATOR

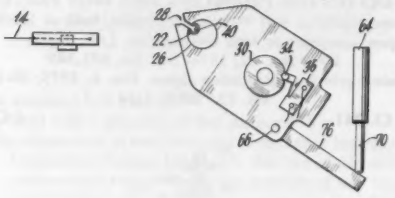
John Broomfield, Bolton, Mass., assignor to Amacoil Machinery, Inc., New Rochelle, N.Y.

Continuation-in-part of Ser. No. 493,776, Aug. 1, 1974, Pat. No. 3,949,945, which is a continuation-in-part of Ser. No. 224,686, Feb. 9, 1972, abandoned. This application Apr. 23, 1975, Ser. No. 570,575

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.² H01F 41/06, 41/10

U.S. Cl. 242—7.17 25 Claims



1. An apparatus for wrapping wire on the terminals of a wire carrying bobbin comprising:

a bobbin holder,

means for engaging the wire comprising a housing, notch means therein for receiving said wire,

means for rotating said notch means in said housing and about the terminal such that the wire is wrapped on the terminal, and

means for breaking the wire when said rotating means has completed wrapping, and means for breaking the wire comprising means for pivoting said housing away from said bobbin holder.

4,023,741
APPARATUS FOR WINDING A MULTIPLICITY OF THREADS ONTO RESPECTIVE BOBBIN TUBES

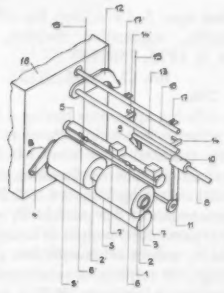
Hugo Schar, Dattlikon, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Nov. 12, 1975, Ser. No. 630,945

Claims priority, application Switzerland, Nov. 15, 1974, 15235/74

Int. Cl.² B65H 54/02, 67/04

U.S. Cl. 242—18 R 7 Claims



1. An apparatus for winding a multiplicity of threads onto respective bobbin tubes, said apparatus comprising:

a common bobbin chuck for receiving a multiplicity of bobbin tubes thereon;

a bobbin package drive for driving said chuck with the bobbin tubes thereon;

a plurality of thread traversing guides, each guide being positioned adjacent a respective bobbin tube on said bobbin chuck;

a plurality of thread reserve winding devices, each said device being positioned adjacent a respective bobbin tube on said bobbin chuck;

a movable thread severing means for moving relative to said bobbin chuck to sever the threads supplied to the bobbin tubes on said bobbin chuck;

a movable common thread suction means for moving with said severing means to draw on the ends of several threads;

a plurality of pairs of thread holders, each said pair of thread holders being positioned at a respective bobbin tube on said bobbin chuck, one of said holders of each said pair of holders being movable from a first position located out of the path of a respective thread to a second position to move the respective threads into the other of said pair of holders and onto a respective bobbin tube on said chuck, and back to said first position while allowing each thread to move into a respective reserve winding device and into a respective traversing guide.

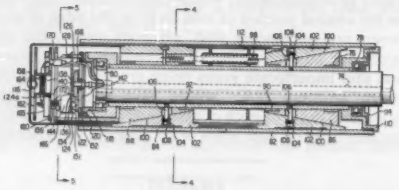
4,023,742
YARN WINDING APPARATUS

Malcolm P. Owens, and Edgar E. Barnes, both of Charlotte, N.C., assignors to Fiber Industries, Inc., Charlotte, N.C.

Continuation of Ser. No. 506,703, Sept. 17, 1974, abandoned, which is a division of Ser. No. 411,560, Oct. 31, 1973, abandoned. This application Mar. 11, 1976, Ser. No. 665,750

Int. Cl.² B65H 67/00

U.S. Cl. 242—18 DD 1 Claim



1. In a yarn winder having a rotatable cylinder, means for securing a bobbin to the cylinder, means for rotating the cylinder to permit the winding of yarn on the bobbin during rotation of the cylinder, a bobbin release mechanism for permitting release of the bobbin from the means for securing and means for discontinuing rotation of the cylinder, a bobbin release control comprising:

a. a stationary first plate;

b. a second plate movable with respect to the first plate, said second plate having first and second positions with respect to said first plate;

c. a spring coupling the first and second plates, said spring biasing the second plate in its first position;

d. means for preventing release of the bobbin until the bobbin has stopped comprising:

1. a valve coupled to the first plate, said valve having a bore and inlet and outlet ports, said inlet port being coupled to a fluid source and said outlet port being coupled to the bobbin release mechanism;

2. first and second pistons movable in the bore of said valve, said first piston having first and second positions in the bore, said first position of said first piston closing the inlet port and the second position not closing the inlet port, said second piston having first and second positions, said first position of said second piston not closing the outlet port and the second position closing the inlet and outlet ports and contacting the first piston;

3. a spring affixed within the bore and coupled to the first piston;

4. said means for discontinuing rotation of the cylinder

being coupled to said second plate so that activation of said means for discontinuing rotation of the cylinder causes said second plate to initially move to its second position;

5. means coupling the second piston to the second plate so that motion of the second plate to its second position with respect to the first plate causes the first and second pistons to initially move from their first positions to their second positions and whereafter said spring causes the second plate to return to its first position from its second position and causes the second piston to return to its first position to activate said bobbin release mechanism.

4,023,743

TEXTILE MACHINE, ESPECIALLY SPINNING MACHINE

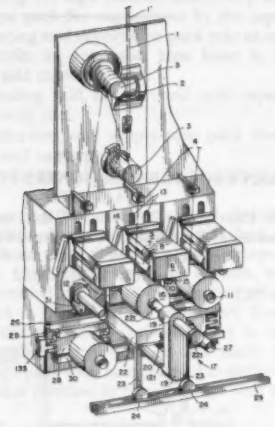
Heinz Schippers, Remscheid-Lennep, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Oct. 17, 1975, Ser. No. 623,477

Claims priority, application Germany, Oct. 17, 1974, 2449415

Int. Cl.² B65H *54/02*; D01H *9/10*

U.S. Cl. 242—35.5 A 15 Claims



1. In a textile machine, especially a spinning machine, with like winding devices arranged in tiers and having horizontal spool spindles, a spool changing carriage traversable along the machine and spool conveyor means traversable independently thereof along the machine, the improvement

that the projecting spool spindles, the path of movement of the spool changing carriage as well as the path of movement of the spool conveyor means lie vertically underneath each other forwardly of the machine front, that there are provided means for traversing the spool changing carriage in a horizontal plane situated between the spool spindles and the path of movement of the spool conveyor means and that the carriage carries a gripper comprising a gripper shaft extending perpendicularly to the machine front, there being provided means for shifting said shaft in a forward and rearward direction, and said gripper having mounted thereon at least one arm carrying a gripper head, the gripper head on its arm being movable along a path clear of said spool spindles, said spool changing carriage and said spool conveyor means, and that there are provided means for arresting the spool changing carriage and the spool conveyor means in predetermined locations such that at any time at least one spool spindle and one spool receiving device of the spool conveyor means lie on the path of movement of the gripper.

4,023,744

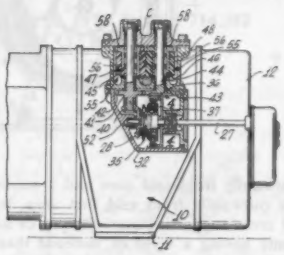
WINCH WITH CABLE TENSIONING DEVICE OPERABLE DURING REELING OUT AND REELING IN

Donald P. Shutt, Long Beach, Calif., assignor to Western Gear Corporation, Lynwood, Calif.

Filed Apr. 19, 1976, Ser. No. 677,878

Int. Cl.² B65H *75/00*

U.S. Cl. 242—54 R 7 Claims



1. An apparatus for preventing fouling of cable on a power driven cable drum during paying out and reeling in cable, said drum having a powered drive shaft;

roller means adapted for non-slipping engagement with a cable running alternately off and onto said cable drum,

a transmission intercoupled between said powered drive shaft for driving said roller means reversely in cable paying out and retrieving directions as the drum pays out and retrieves cable,

friction slip clutch means in said transmission,

said transmission also including a one-way clutch adapted to positively drive said roller means in the direction to pay out cable, and another one-way clutch adapted to hold back on said roller means in the direction to retrieve cable, and

said transmission having an automatically selective gear means responsive to the direction of cable drive providing one drive ratio such as to over-drive the said roller means during cable pay-out, at a large cable wrap diameter on the drum, and a different drive ratio to under-drive said roller means during reeling in, at a low cable wrap diameter on the drum, said friction slip clutch accommodating drive ratio change while said roller means maintains non-slipping engagement with the cable.

4,023,745

ENDLESS TAPE CARTRIDGE

Masaoki Sekine, and Haruo Shiba, both of c/o TDK Electronics Co., Ltd., 2-14-16 Uchikanda, Chiyoda, Tokyo, Japan

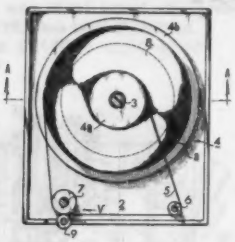
Continuation of Ser. No. 400,401, Sept. 24, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,125

Int. Cl.² B65H *17/48*

U.S. Cl. 242—55.19 A 1 Claim

1. In an endless tape cartridge of the type having an upper casing, a lower casing, a room formed in the casings, a winding axis extending from one casing toward the other casing, a reel

within the room having a core disposed about the axis, and an endless tape disposed about the reel extending from a central portion of the reel to the periphery thereof, the improvement comprising a tape supporting disc formed integral with and extending radially outwardly from said core, said disc having a tape supporting surface including a first area extending radially outwardly from said core and a second area extending radially outwardly from said first area, both said first and second areas supporting convolutions of said tape, said first area only having a layer of material thereon whereby the friction factor of a said first area is reduced as compared to the friction factor of said second area.



4,023,746

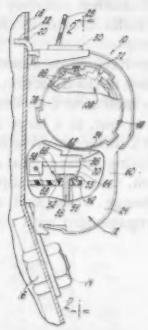
BELT RETRACTOR WITH WINDING PREVENTION AND MEMORY MECHANISM

Joseph J. Magyar, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 587,406, June 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 563,100, March 28, 1975, abandoned. This application May 19, 1976, Ser. No. 687,879

Int. Cl.² A62B *35/00*; B65H *75/48*

U.S. Cl. 242—107.7 **10 Claims**



1. In combination, an automotive vehicle having an occupant seat, a restraint belt for restraining the occupant in the seat, a reel having the belt wound thereon, a winding spring urging reel winding rotation to retract the belt to a stored position on the reel and pull the belt taut against the occupant when the belt is engaged in restraining position about the occupant, a locking mechanism effective to prevent belt extension only in response to a sensed acceleration condition so that the occupant may extend the belt for engagement in restraining position about the occupant and further extend the belt to permit leaning movement of the occupant in the seat by pulling the belt from the real against the winding spring, a detent mechanism effective when actuated to block winding rotation of the reel by the winding spring to hold the belt extended at its then length against the urging of the winding spring, and control means responsive to reel rotation induced by belt pull and urging of the winding spring and effective to control actuation of the detent mechanism such that the detent mechanism is actuated to hold the belt extended at a set condition of slackness with respect to the occupant upon predetermined sequence of reel rotation, and further effective to define the limits of a range of permissible further belt extension beyond the set condition of slackness as the occupant leans forwardly and to deactuate the detent mechanism during belt extension within the defined limited range to permit belt retraction by the winding spring as the occupant returns from the forwardly leaning position and then reactuate the detent mechanism when the belt is retracted to the length providing the set condition of slackness, said control means including means to deactuate the detent mechanism in response to reel rotation corresponding to belt extension beyond the defined limited range of permissible further extension whereby the urging of the winding spring pulls the belt taut against the occupant when the occupant returns from the forwardly leaning position and retracts the belt to stored position when released from engagement in restraining position.

4,023,747

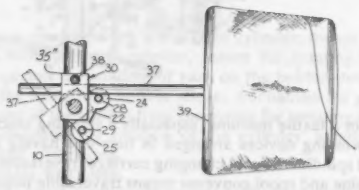
YARN PACKAGE POSITIONERS FOR TEXTILE MACHINES

Ralph R. Champagne, Woonsocket, R.I., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed May 17, 1976, Ser. No. 687,920

Int. Cl.² B65H *49/02*

U.S. Cl. 242—130 **1 Claim**



1. A yarn package positioner for textile machines comprising:

a. a support rod;

b. means defining a clamp member selectively positionable on said support rod;

c. a bar member having one end fixed in said clamp member and extending therefrom in a plane normal to the axis of said support rod;

d. a lever member pivotally mounted on said bar member having a pair of opposed ear elements forming a clamping means at one end thereof;

e. a yarn package support spindle supported by said clamping means; and

f. a locating bracket fixed on the bar member having a pair of spaced pin members fixed therein and extending therefrom in a plane parallel with the axis of said bar member to positions of operative association with said support spindle for limiting pivotal movement of the latter between a first position for donning and doffing a yarn package therefrom and a second position for withdrawing yarn from the yarn package.

4,023,748

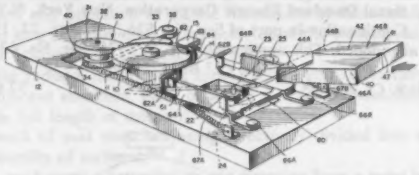
CASSETTE LOADING AND TAPE TENSIONING SYSTEM

Donald L. Burdorf, Newport Beach; Gerhard Rotter, Mission Viejo, and Harold E. Arns, Chino, all of Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation-in-part of Ser. No. 498,446, Aug. 19, 1974. This application May 3, 1976, Ser. No. 682,650

Int. Cl.² G11B *15/32*, *15/66*

U.S. Cl. 242—192 29 Claims



1. A cassette loading and tape tensioning system for use with a tape transport mechanism having a take-up reel and a carriage mounted supply reel which is driven by surface engagement with a capstan, the tape pack on the supply reel being contained in a cassette, said system comprising:

means for opening the tape cassette sufficiently to expose the supply tape pack for engagement by the capstan;

means for advancing said supply tape pack into an operative position wherein its outermost tape layer is in close contact with said capstan;

means for threading said tape around said capstan and about the take-up reel;

means for withdrawing said supply tape pack from close contact with said capstan;

means for removing tape slack from said supply tape pack; and

means for sequencing the operation of said cassette opening, tape pack advancing, withdrawing and slack removal means so that said cassette is opened as said tape pack is advanced into close contact with the capstan, said tape then being threaded about said take-up reel after which said tape pack is caused to be withdrawn from close contact with the capstan so that slack may be removed therefrom through the action of said slack removal means, said tape pack then being caused to advance again into its operative position in close contact with the capstan.

4,023,749

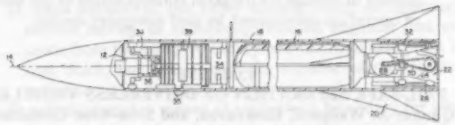
DIRECTIONAL CONTROL SYSTEM FOR ARTILLERY MISSILES

William C. McCorkle, Jr., Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 8, 1975, Ser. No. 638,480

Int. Cl.² F42B *13/30*, *15/18*; F41G *7/14*, *9/00*

U.S. Cl. 244—3.22 5 Claims



1. A directional control system for maintaining a missile on a launch predetermined path comprising:

a. a gyroscope mounted with its spin axis and rotor aligned with the longitudinal axis of said missile at launch;

b. actuating means including a plurality of jet vanes disposed in pairs about the aft end of said missile;

c. acceleration switch means for differentially canting said vanes for producing a spin to said missile responsive to initial acceleration thereof;

d. control means for receiving signals from said gyro and actuating said actuator means for deflecting opposing pairs of jet vanes in unison in proportion to gyro pitch and yaw signals.

4,023,750

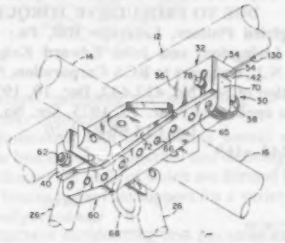
ADAPTER MECHANISM FOR QUICK FOLD-UP OF HANG GLIDER FRAMES

James C. Tigner, 11330 E. Riverside Drive, No. 9, Bothell, Wash. 98011

Filed Aug. 11, 1976, Ser. No. 714,352

Int. Cl.² B64C *31/02*

U.S. Cl. 244—16 7 Claims



1. Frame adapter for rapid unfolding and folding up of a hang glider frame, comprising:

a. a stationary member for being secured to a keel member of said hang glider frame,

b. a clamp member pivotally secured to said stationary member, said stationary member and clamp member being releasably locked together in an operative relationship,

c. a control bar support member adapted to be held between said clamp member and said stationary member when said clamp member and said stationary member are in an operative mode,

d. a cross tube connector member adapted to be held between said clamp and stationary members when in said operative mode, and

e. guide cable means, one end of said guide cable means being secured to said stationary member and extending through said connector member and being secured to the forward end of said keel member.

4,023,751

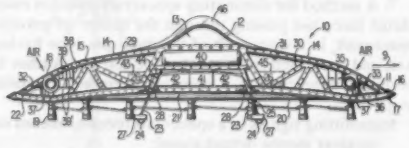
FLYING SHIP

Walter A. Richard, 1501 Sabine Ave., Port Arthur, Tex. 77640

Filed July 28, 1976, Ser. No. 709,270

Int. Cl.² B64C *29/00*, *15/02*

U.S. Cl. 244—23 C 12 Claims



1. A flying ship comprising a hollow saucer-shaped body, plural jet engines for lifting and propelling said ship, an annular fluid motor tube concentrically mounted within said saucer-shaped body, an endless train of spaced pistons slidably mounted within said annular fluid motor tube, injection means

for injecting high pressure jets of fuel into said fluid motor tube behind said pistons to cause sliding movement of said train of pistons in one direction within said tube, plural fuel outlet means from said fluid motor tube for conducting fuel from said fluid motor tube to said jet engines, jet mounting means for adjustably mounting each of said jet engines to said body beneath said annular fluid motor tube, each of said jet engines having fuel inlet means in communication with one of said plural fuel outlet means from said fluid motor tube, and control means for varying the direction of fluid thrust produced by said engines, said endless train of pistons when moved by said high pressure fuel jets providing gyroscopic action to stabilize said flying ship in flight.

4,023,752

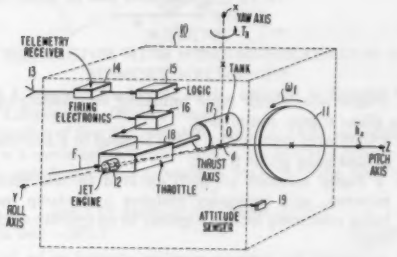
ELIMINATION OF RESIDUAL SPACECRAFT NUTATION DUE TO PROPULSIVE TORQUES

Josef Siegfried Pistiner, Lafayette Hill, Pa.; Ludwig Muhlfelder, Livingston, and John Edward Keigler, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 423,442, Dec. 10, 1973, abandoned. This application Mar. 13, 1975, Ser. No. 558,182

Int. Cl.² B64G *1/20*

U.S. Cl. 244—169 **7 Claims**



1. A control system for a spacecraft of the dual-spin type having a spin axis and a characteristic nutation frequency, and further having a platform despun from a spinning member, for eliminating nutation caused by a thrust force not passing through the center of gravity of said spacecraft comprising:

receiver means included in said spacecraft for receiving signals transmitted to said spacecraft, and generating in response thereto a receiver means output signal; and

force generating means mounted on said platform and coupled to said receiver means and, in response to said receiver output signal, activating said force generating means for an operating time, τ, wherein said force generating means operating time, τ, is:

$$\tau = \frac{2\pi n}{\omega_n}$$

where n is an integer and ω_n is said nutation frequency.

7. A method for eliminating spacecraft nutation caused by a thrust force not passing through the center of gravity of said spacecraft, in a spacecraft of the dual-spin type having a spin axis and a characteristic nutation period and further having a platform despun from a spinning member, comprising the steps of:

transmitting signals to a spacecraft receiver means causing a receiver means output signal;

activating a force generating means mounted on said spacecraft in response to said receiver output signal for an operating period, τ;

deactivating said force generating means at the end of said operating period, τ, wherein said force generating means operating period, τ, is:

$$\tau = \frac{2\pi n}{\omega_n}$$

where n is an integer and ω_n is said nutation frequency.

4,023,753

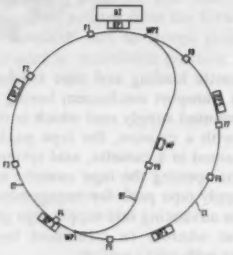
VEHICLE CONTROL SYSTEM

Karl U. Dobler, Waiblingen, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 526,300, Nov. 22, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,719

Int. Cl.² B61L *27/00*

U.S. Cl. 246—5 **37 Claims**



1. A control system for a guided transport system comprising:

a guideway;

a plurality of vehicles each traveling along said guideway;

a predetermined number of stations disposed along said guideway;

an input device disposed at each of said stations to enable each passenger desiring to use said transport system to enter his destination;

a command and control center in communication with each of said plurality of vehicles and each of said input devices, said center receiving from each of said input devices simultaneously destination information and the identity of that one of said input device providing said destination information to provide start information;

memory means disposed in said center containing control information for standard and diversion routes for all possible start-destination relationships;

computer means disposed in said center which determines from all input information from said input devices to said center whether said transport system should operate in a demand service mode or a scheduled service mode at that moment in view of given operating criteria; and

first means coupled to said memory means, said computer means and said plurality of vehicles to communicate operating commands to each of said plurality of vehicles, said operating commands being a sequence of stored control information for said standard routes, said sequence of control information corresponding to the mode of operation determined by said computer means.

4,023,754

FAIL-SAFE SEPARATION OF DRIVERLESS VEHICLES

Gunnar A. Wallgard, Huskvarna, and Sven-Arne Gustafsson, Taberg, both of Sweden, assignors to Saab-Scania Aktiebolag, Linkoping, Sweden

Filed Mar. 26, 1976, Ser. No. 670,755

Claims priority, application Sweden, Apr. 1, 1975, 7503672

Int. Cl.² B61L *21/06*

U.S. Cl. 246—63 R **5 Claims**

1. A control system for a plurality of remotely controlled vehicles traveling in one direction along a defined path that is divided into longitudinally adjacent blocks, each block having

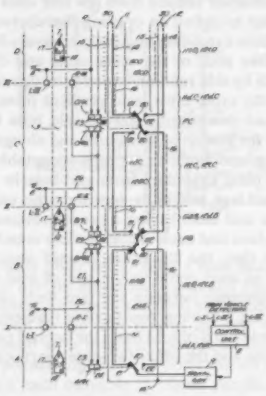
an entry boundary which a vehicle crosses upon entering that block and an exit boundary which the vehicle crosses upon entering the next block in said direction, said control system being of the type comprising electrically conducting radiator means extending lengthwise substantially all along said path, means for energizing said radiator means with an electric current that tends to cause short range radiation to propagate from the radiator means energized thereby and enables successive commands to the vehicles to be encoded in such radiation, and detector means on each vehicle responsive to such radiation and operative to enable movement of the vehicle only so long as radiation is being detected at the vehicle, said control system being characterized by:

A. the radiator means being arranged in a pair of laterally adjacent stretches, each of which extends substantially the full length of the path,

B. each of said stretches being effectively divided into a plurality of sections;

1. each section extending in one direction from a point in one block that is spaced from the boundaries of that block to a corresponding point in the next block in said direction,

2. each section of one stretch being substantially coterminous with a section of the other stretch that is paired



with it, the sections of each pair being alternatively energizable, and

3. each section being capable of conducting current all along its length;

C. each section of one of said stretches being a cruise section having an effectively shielded segment that extends from said point in a block to the exit boundary of that block, the remainder of the section being capable of propagating radiation upon current flow therethrough;

D. each section of the other stretch being an approach section having an effectively shielded segment that extends from the entry boundary of a block to said point in that block, but being otherwise capable of propagating radiation upon current flow therethrough;

E. vehicle detector means at each block boundary for producing a momentary output in response to passage of a vehicle across the boundary; and

F. means responsive to outputs from said vehicle detector means for so energizing one of each pair of sections, by connection with the energized one of the next preceding pair of sections relative to said direction of travel, as to prevent a vehicle from approaching the entrance boundary of a block occupied by another vehicle, the last mentioned means comprising bistable switching means.

4,023,755

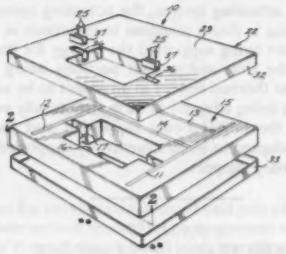
TRANSFORMER MOUNTING PAD

John Alesi, Jr., Topanga, Calif., assignor to Formex Manufacturing, Inc., Venice, Calif.

Filed June 24, 1976, Ser. No. 699,443

Int. Cl.² H02B 5/00; B65D 19/24

U.S. Cl. 248—19 **9 Claims**



1. An improved mounting for supporting an electrical power transformer comprising:

a wooden framework with intersecting lateral and transverse cross braces joined together and defining a quadrilateral enclosure the walls of which are formed by ones of said cross braces to provide support for a variety of transformer configurations;

a cellular structure surrounding and encasing said framework and defining an aperture located between lateral ones of said braces,

a plurality of support blocks fastened to and extending interiorally from ones of said lateral braces through said cellular structure to opposing boundaries of said aperature,

a plastic shell encasing said wooden framework and said cellular structure with upper and lower generally planar surfaces and having a walled opening therein conforming to the aforesaid aperture; and

fastening means extending through said shell and through said support blocks to secure said shell to said framework.

4,023,756

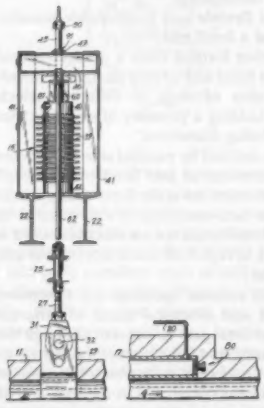
THERMOPNEUMATIC SUPPORT DEVICE

Thomas W. Baker, 25 Stewart Place, Mount Kisco, N.Y. 10549

Filed Oct. 14, 1975, Ser. No. 621,791

Int. Cl.² F16L 3/20

U.S. Cl. 248—59 **15 Claims**



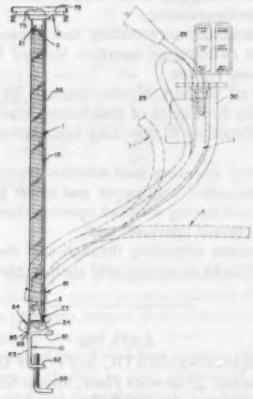
14. A thermopneumatic support device for providing sup-

port over a range of positions for objects subject to temperature changes and thus to thermomechanical changes in position, the support device comprising variable volume thermopneumatic actuating system means having first and second portions relatively movable with respect to each other and thermal conducting means adapted to be in thermally conductive contact with the object to be supported and thus providing a path for thermal energy between an object to be supported and the actuating system, the actuating system means varying in volume in direct response to variations in temperature of the object being supported the energy for the relative movement of the first and second portions being obtained directly from the thermal energy in an object to be supported; the first portion being adapted to be in structurally supporting connection to the object being supported and the second portion being adapted to be in structurally supported connection to a stationary support.

4,023,757
PATIENT CONTROLS HOLDER

Charles D. Allard, 6853 Payne Court, Pleasanton, Calif. 94566, and Eugene R. Allard, 840 Delano Ave., San Lorenzo, Calif. 94580

Filed Mar. 5, 1976, Ser. No. 664,377
Int. Cl.² F16L *3/08*
U.S. Cl. 248—70 **7 Claims**



1. A holder device for holding control members having electrical cords of differing diameters to hospital beds, furniture, or shelving comprising:

a. an elongated flexible and positionable member having a head end and a front end;

b. a head member formed from a di-electric material connected to the head end of said elongated member formed with a plurality of slots of differing selected widths adapted for holding a plurality of said electrical cords of selected differing diameters;

c. said slots are defined by parallel side walls extending from the outer perimeter of said head to a generally circular opening positioned inwardly from said perimeter head;

d. the distances between each of said parallel side walls is selected to forcibly accept an electrical cord of standard diameter and to reject all cords not of said selected standard diameter;

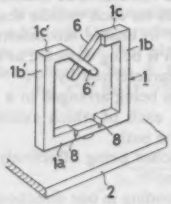
e. said generally circular openings are dimensioned to frictionally hold said electrical cords of different standard sizes in a frictional grip to prevent slippage therethrough after positioning and have diameters slightly greater than the widths of said slots with which they connect; and

f. connection means connected to the foot end of said elongated member adapted for attachment to said hospital beds, furniture or shelving.

4,023,758
PLASTIC DEVICE FOR SUPPORTING CORDS AND OTHER ELONGATED BODIES

Takuo Yuda, Yokohama, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed Dec. 5, 1975, Ser. No. 637,913
Int. Cl.² F16L *3/08*
U.S. Cl. 248—73 **1 Claim**

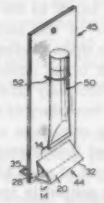


1. A one-piece plastic device for supporting cords and other elongated bodies relative to an apertured plate including a body having a lower base contacting said plate, two side legs extending upwardly away from opposite ends of the lower base, two cross arms extending substantially parallel to said lower base in cantilever fashion from the free ends of the legs toward each other to define an opening therebetween, a pair of flexible members extending angularly inwardly toward said base from the free ends of the cross arms and overlapping each other in side by side relation to close the opening defined by the ends of the cross arms, said resilient members being angularly disposed downwardly toward said base to define a V-shaped throat for lead-in of said cords and elongated bodies into said opening, and anchoring means acceptable within an aperture of said plate extending from said base in a direction opposite from said legs, said body, legs and arms each lying on a common plane and each having a predetermined thickness relative to said plane and each of said flexible members having a thickness less than the thickness of said arms and each having a length at least equal to the size of said opening as defined by the distance between the free ends of said cross arms and said base including two flexible resilient hinge elements joining three parts of said base, the central part carrying said anchor means and the other two outer parts carrying said side legs.

4,023,759
DISPLAY PACKAGE

William Perkins, Etobicoke, Canada, assignor to Reid Dominion Packaging Ltd., Hamilton, Canada

Filed June 29, 1976, Ser. No. 700,845
Int. Cl.² A47F *5/11*
U.S. Cl. 248—174 **4 Claims**



1. A self-supporting display package comprising a card member and first and second similar leg panels all articulably connected together about substantially a common hinge line;

a first and a second intermediate panel articulably connected to each other and articulably connected to the first and second leg panel respectively at locations remote from the card member;

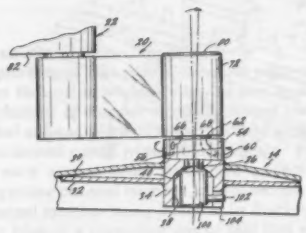
the leg panels and the intermediate panels being swingable between a first configuration in which all panels and the card member lie in parallel planes with the leg panels juxtaposed together and the intermediate panels juxtaposed together, and a second configuration in which the said panels define a bipedal supporting base for the card member with the joins between the leg panels and the respective intermediate panels adapted to contact a supporting surface;

the card member having two downwardly extending tabs adjacent the ends of said common hinge line, the intermediate panels defining at least one slot adapted to register with the inner edge of a tab when the panels are in said second configuration, the panels being capable of assuming a third configuration in which the two intermediate panels are inverted between said leg panels and all panels are juxtaposed in parallel contacting relation.

4,023,760
SWIVEL CHAIR

Gerard A. Robinson, 1928 Galerita Drive, San Pedro, Calif. 90732

Filed Dec. 22, 1975, Ser. No. 643,407
Int. Cl.² F16M 11/24
U.S. Cl. 248—188.2 9 Claims



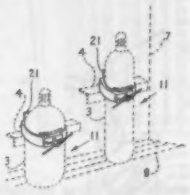
1. A movable chair comprising a base adapted for placing on a surface, upright means having an axis centrally carried by the base, jointed arm means carried by the upright means and a chair carried by the arm means, the arm means including first and second arms extending perpendicular to said upright means and pivoted together at a point spaced from said axis so that they are each movable in planes parallel to each other, the upright means including a spindle, the arm means being mounted to be rotatable about the spindle, and adjusting means providing a relationship between said spindle and the base means whereby relative rotation of the spindle changes its position whereby it may be adjusted to an exact vertical position, and means for holding said spindle in vertical position with respect to the base.

4,023,761
ADJUSTABLE BRACKET TO STABILIZE UPRIGHT COMPRESSED GAS CONTAINERS AGAINST DISPLACEMENT ON MOBILE VEHICLES AND SHIP-BOARD INSTALLATIONS AND MAINTENANCE SHOPS

John Molis, P.O. Box 458, Carson City, Nev. 89701

Filed June 14, 1976, Ser. No. 695,524
Int. Cl.² A47F 5/00; B65D 19/10; F16L 5/00
U.S. Cl. 248—313 7 Claims

1. An adjustable brace for holding a gas-filled container in an upright stabilized condition while under mobile transport; said adjustable brace comprising, in combination with a gas-filled container standing upright alongside a wall and with an upright flat bar secured to said wall in parallel spaced relation thereto, a container-encircling collar having a pair of diametrically opposite horizontally extending passages therethrough arranged in axial alignment with one another as well as having a vertically extending slot therethrough encompassing said flat bar, a pair of braces on said collar of which one of said pair of braces is movably mounted within one of said pair of horizontally extending passages and the other of said pair of braces is movably mounted within the other of said pair of horizontally extending passages, an arcuate section on each of said braces for engaging opposite sides of the periphery of said container,

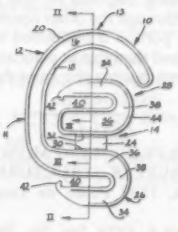


and means for moving said other of said pair of braces to bring said arcuate section thereof into engagement with an adjacent portion of the periphery of said container thereby bringing the arcuate section of said one brace into engagement with an opposite side portion of the periphery of said container as well as tightening the rear of said collar against said upright flat bar.

4,023,762
ARTICLE SUSPENSION DEVICE

John H. Batts, Grand Rapids, and Everett L. Duester, Holland, both of Mich., assignors to John Thomas Batts, Inc., Zeeland, Mich.

Filed Jan. 9, 1976, Ser. No. 647,731
Int. Cl.² A44B 21/00; A47F 7/08
U.S. Cl. 248—359 18 Claims



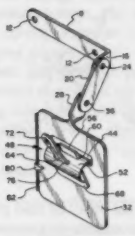
1. An article suspending device comprising: a body member of U-shaped configuration having a central web and a pair of generally spaced parallel depending wings, one on each side of said central web and defining an article channel therebetween; a support engaging member secured to said body member for supporting said body member; each of said wings being bifurcated and defining a slot opening through one end and extending generally parallel to said central web for engaging the article positioned between said wings, said wings and central web being integral and joined by hinge elements, said support engaging member being a hook integral with said body member whereby said hanger can be molded of plastic material as a single flat part and subsequently folded into operating configuration.

4,023,763

HOLDER FOR RECIPE CARDS AND THE LIKE

Harvey E. Pulley, 3366 W. 90th, South, West Jordan, Utah 84084

Filed Dec. 5, 1975, Ser. No. 637,896
Int. Cl.² B42D 9/00
U.S. Cl. 248—452 1 Claim



1. A pendant recipe card holder comprising

a bracket member adapted for mounting on the underneath surface of a shelf or similar structure, and including a flange which extends generally downwardly when the bracket member is so mounted,

a generally flat support plate having a front face and a back face, one end of said support plate being attached to the flange to pivot between a pendant position and a position in which the plate is generally parallel with said underneath surface to which the bracket is mounted, said support plate having an opening therein near said one end of the plate and a tab extending from the margin of the opening generally upwardly of the margin, and a clip member comprising

an elastic strip of material having a pair of openings in the wall thereof and formed into a demi-cylinder so that the ends of the strip are generally contiguous, said strip being disposed so that one end of the strip extends through the opening in the support plate and curves downwardly to engage the back face of the support plate, so that the tab extends through one of the openings in the strip, and so that the other end of the strip curves forwardly and downwardly of the support plate, and

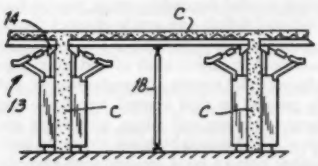
a lever element having an engagement portion and a finger portion extending from the engagement portion, said lever element being disposed so that the finger portion thereof extends through the other opening in the strip and the engagement portion is positioned between said other end of the strip and the support plate and is forced by said other end to press against the front face of the support plate.

4,023,764

APPARATUS FOR PRODUCING MONOLITHIC CAST CONCRETE STRUCTURES

Arthur C. Clements, 1507 Ponce de Leon, Santurce, P.R. 00909

Filed July 6, 1976, Ser. No. 702,477
Int. Cl.² E04G 11/02, 11/48, 17/18
U.S. Cl. 249—27 7 Claims



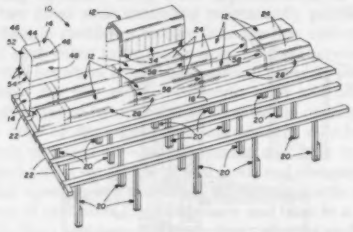
1. A wall form member for use in fabricating a monolithic inverted U-shaped concrete structure, said form including vertically extending spaced parallel panel members defining a downwardly open chamber, the upper terminal edge of one said panel member being defined by a bevel portion downwardly inclined at an acute angle with respect to the horizontal in a direction away from said other panel, a removable support bar mounted above said bevel portion having a top surface defining the uppermost portion of said form, said bar extending along substantially the entire length of said form and including a lower surface portion seated on and defining a complemental angle with said bevel portion and operator means extending between said support bar and said one panel for shifting said bar downwardly and inwardly while said lower surface of said bar is engaged with said bevel portion.

4,023,765

CONCRETE FLOOR FORMING SYSTEM

James Robert Kinnamon, 1502 Buena Vista, Mesquite, Tex. 75149

Continuation of Ser. No. 519,561, Oct. 31, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 668,325
Int. Cl.² E04G 11/40
U.S. Cl. 249—29 3 Claims



1. A concrete forming system comprising:

a plurality of forms each having a substantially planar upper wall extending to curved shoulders at each edge thereof and side walls depending from the shoulders and each including an upper outwardly tapered portion extending to a lower portion with the lower portions of the side walls of each form extending parallel to each other and perpendicularly to the upper wall;

the upper wall and the side walls of each form extending to open ends with an integral lip extending from one end thereof with the outer surface of the lip being substantially aligned with the inner surface of the walls and shoulders of the forms such that the lip receives and supports the opposite end of an adjacent form to position the outer surfaces of the upper walls and the side walls of the adjacent forms in substantial alignment across the joint therebetween;

a plurality of end caps each having an upper wall and side walls which are similar in cross-section to the upper wall and the side walls of theforms and extending to a transversely disposed outwardly tapered end wall, said end caps receiving the forms therein;

the side walls of the forms and end caps each having at least one set of holes formed therethrough with each set of holes including at least two vertically spaced holes formed through the lower portion of the side wall;

a plurality of wooden stringers each extending adjacent to the side wall of at least one form and each stringer having a plurality of equally spaced locating pin receiving apertures formed therein in spaced relation one from the other along the length thereof;

a plurality of nails each extending through at least one of the holes of each set of holes in the side wall of the form and end caps and into the wooden stringer extending adjacent thereto for supporting the form on the stringer; and

a plurality of post shores supporting the stringers and having

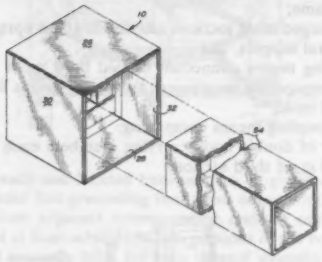
locating pins extending from the upper ends thereof in engagement with the apertures of the stringers, thereby supporting the form secured thereto.

4,023,766

STRUCTURAL SUPPORT FOR A CONCRETE FORM

Donald S. Lubov, San Jose, Calif., assignor to Georight Industries, Inc., San Jose, Calif.

Filed Nov. 6, 1975, Ser. No. 629,274
Int. Cl.² E04G *13/02, 17/14*
U.S. Cl. 249—48 **7 Claims**



1. A structural form comprising
a. a plurality of first panels joined in edge-to-edge succession to form an enclosure having two open ends; and
b. a plurality of channel members at least one for each first panel and each formed of tab portions comprising at least two second panels joined to one another with a first edge of each second panel defining a respective edge of a respective channel member, of said second panels of each channel member being joined at its first edge to a respective edge of a respective one of said first panels which is at an open end of said enclosure, and the other of said second panels of each channel member extending to and having its first edge abutting against an inner surface of the respective one of said first panels;
each of said channel members being approximately equal in length to the length of the respective one of said first panels to which it is joined; and wherein the channel members which are joined to alternate ones of said first panels have a recess at each end thereof for receiving an end of an adjacent one of said channel members, whereby alternate ones of said channel members nest in respective recesses in the ends of adjacent channel members, thereby providing a relatively rigid structural form.

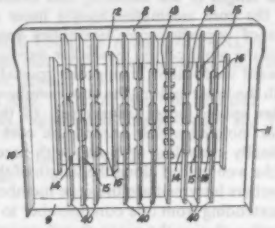
4,023,767

MOLD BOX AND MOLD HEAD

Joseph R. Fontana, 2130 Broadway Ave., Pittsburgh, Pa. 15216

Filed June 15, 1976, Ser. No. 666,064
Int. Cl.² B28B *7/20*
U.S. Cl. 249—52 **4 Claims**

1. A mold box and head combination comprising, a mold having spaced sides and ends defining a rectangular enclosure,
a bottom plate,
longitudinally spaced partions attached to said plate and extending across said mold box,
vertically-extending core members fixed to said mold box bottom plate and extending upwardly therefrom for forming elongated cells in blocks,
said core members being generally plate-like members having rounded ends,
one said partition being made of spaced, generally diamond-shaped members fixed to said mold box and extending upwardly therefrom whereby two said blocks in concrete can be made together and fractured along a line defined by the spaces between said diamond-shaped partition



members, thereby providing a fluted face on one side of said block.

4,023,768

ICE CUBE MOLD

Crisogono Herrera-Casasus, Escobedo Sur 733 Suite 201, Monterrey, Nuevo Leon, Mexico

Filed Feb. 24, 1975, Ser. No. 552,057
Int. Cl.² F25C *1/04*
U.S. Cl. 249—81 **5 Claims**

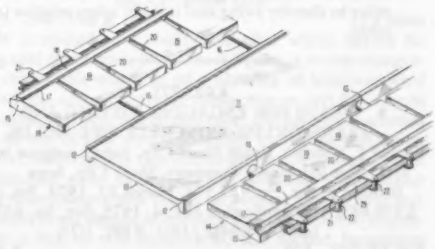
1. Ice cube making and release means comprising in combination, a longitudinal outer tray member, a mating inner tray member having indentations defining a set of receptacles for forming ice cubes, means positioning said inner tray member within said outer tray member and forming therewith a chamber between said two tray members along the length thereof, and means comprising an inlet opening defined through said inner tray member at one end thereof into said chamber and an outlet opening from said chamber at the opposite end thereof thereby forming a continuous water flow path through said chamber in contact with said receptacles to thereby permit release of cubes frozen in said receptacles by means of water flow through said path.

4,023,769

MOLDING MEANS HAVING OPPOSED CORE ASSEMBLIES

Ray T. Andrews, Jr., Clear Lake, Iowa, assignor to Andrew Corporation, Clear Lake, Iowa

Filed Nov. 22, 1972, Ser. No. 308,646
Int. Cl.² B28B *7/16*
U.S. Cl. 249—64 **10 Claims**



1. Apparatus for making building slabs comprising means

forming an elongated mold cavity, an elongated core assembly extending along each opposite side of the mold cavity, each core assembly including a plurality of core members spaced along the length of the assembly and extending transversely thereof, the core assemblies having inner ends of the core members of opposite core assemblies spaced apart transversely of the mold cavity, means for moving the core assemblies toward each other in opposed spaced relation to positions with the inner ends of the core members of opposite core assemblies spaced apart transversely of the cavity forming means for molding a slab around the core members with a longitudinally extending web and with recesses on opposite sides of the web spaced along the length of the slab, additional core members intermediate the core members of each assembly and extending from one core member to the next adjacent core member closing the space therebetween, said intermediate core members extending from the outer ends of the adjacent core members toward but spaced from the inner ends thereof providing vertically spaced unsupported webs on the outer edges of the slab, the core moving means including means for retracting the respective core assemblies from the mold cavity.

4,023,770

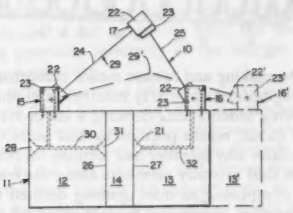
INJECTION MOLDING DIE SYSTEM

Anthony Z. Sedziak, Erie, Pa., assignor to Penn-Erie Manufacturing Company, Erie, Pa.

Filed Aug. 26, 1976, Ser. No. 717,917

Int. Cl.² B22C *9/20*

U.S. Cl. 249—107 **6 Claims**



1. A linkage transfer system for a stacked injection mold comprising,

- **an injection mold having at least a first mold part and a second mold part each having a cavity therein,**
- **means on one of said mold parts for connecting a dispensing nozzle of an injection molding machine to one said mold part,**
- **a first transfer tube and a second transfer tube,**
- **a knuckle joint pivotably connecting said first transfer tube to said second transfer tube,**
- **a second knuckle joint pivotally connecting said first transfer tube to said first mold part,**
- **a third knuckle joint pivotally connecting said second transfer tube to said second mold part, said transfer tubes and said joints defining a portion of an injected material path from said means to said cavities said first mold part and second mold part being movable laterally relative to each other to thereby swing said transfer tubes relative to each other.**

4,023,771

MEANS FOR ENGAGING, LIFTING AND TRANSPORTING CONCRETE PIPE MOLDS

Ronald J. Walchek, South Sioux City, Nebr., assignor to Concrete Pipe Machinery Company, Sioux City, Iowa

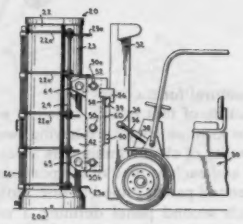
Division of Ser. No. 453,574, March 22, 1974, Pat. No. 3,938,685. This application Dec. 4, 1975, Ser. No. 637,515

Int. Cl.² E04G *13/02*; B29C *1/16*

U.S. Cl. 249—139 **5 Claims**

1. A device for forming and handling concrete pipe adapted for attachment to a vehicle having a lifting mechanism comprising, in combination:

- **a mold operating to define the outer configuration of a concrete pipe comprising:**
- **at least three mold sections normally disposed in upstanding positions;**
- **each of said sections defining a longitudinal segment of the outer configuration of the pipe and being complementary and juxtaposable at longitudinal junctures;**
- **latching means formed along one of said longitudinal junctures between a first two of said three sections for disengageably latching said first two sections together;**
- **hinge means formed along the other two of said longitudinal junctures between said first two sections and the third one of same;**
- **said hinged mold sections adapted to stand upright without lateral support; and**
- **coupling means connected to said third mold section for disengageable securement thereto of means for handling said mold;**
- **said coupling means comprising:**
- **a pair of double hook carrying members each secured to said mold third section;**



- **the members laterally spaced from one another on said mold third section, and**
- **the hooks spaced vertically from one another on each said member and opening downwardly;**
- **a mold handling apparatus comprising:**
- **a frame made up of a first pair of normally vertical rigid plates connected to one another and spaced apart by a pair of elongate normally horizontal rigid shafts;**
- **a second pair of normally vertical rigid plates mounted on said shafts and spaced laterally from one another;**
- **means on said first pair of plates for attaching said frame to the lifting mechanism of a vehicle, and**
- **means on said second pair of plates for removable engagement with said concrete pipe mold;**
- **said latter means comprising a pair of vertically spaced, normally horizontal stub shafts fixedly attached to each of said second pair of plates;**
- **the said pairs of shafts movable laterally towards and away from one another for adjustments to engage the hooks of the said hook carrying members of different size molds by translation of the said second pair of plates laterally towards and away from one another on said frame shaft.**

4,023,772

SLEEVE VALVE COMPRISING A CORE PROVIDED WITH LONGITUDINAL RIBS

Johannes Bernadus Ratelband, No. 1, Jan de Jagerlaan, Laag-Keppel, Netherlands

Filed Mar. 14, 1975, Ser. No. 558,556

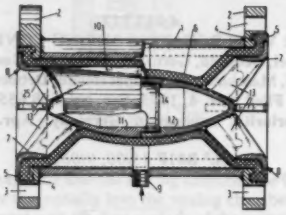
Claims priority, application Netherlands, Mar. 14, 1974, 7403460

Int. Cl.² F16K *7/07*

U.S. Cl. 251—5 **13 Claims**

1. A sleeve valve comprising a torpedo shaped core provided with radial longitudinal ribs which extend substantially the full length of said core, a generally cylindrical sleeve

surrounding said core and made from a material being elastically deformable in a radial direction and a generally cylindrical housing against which the sleeve is sealed at both ends, the radial extent of said ribs being such as to maintain portions of said sleeve in close proximity to the inner surface of said housing along the full lengths of such ribs, characterized in that between each end of the sleeve and the corresponding end of the core at least two approximately radial fins are



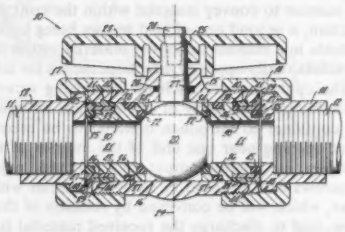
provided, each one located between two longitudinal ribs of the core, said fins presenting inner end edges which incline inwardly from adjacent corresponding ends of said housing toward and at least substantially to portions of the core which are spaced inwardly from the ends thereof whereby the contours of the fins facing the sleeve approximately correspond to the shape the sleeve has in its normally closed state wherein the sleeve engages the core and fins.

4,023,773

TRUE UNION BALL VALVE

Eugene H. Wise, Santa Ana, Calif., assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

Filed Jan. 28, 1976, Ser. No. 653,205
Int. Cl.² F16K *5/06*
U.S. Cl. 251—148 **12 Claims**



1. In a true union ball valve of the type including a body having a continuous axial chamber, a rotatable ball in the center of said chamber, and a seal carrier in said chamber, on each side of said ball, the improvement wherein the outer diameter of at least a portion of each seal carrier is less than the diameter of said chamber to define a radial space between each seal carrier and said body and an abutment in the outer surface of each seal carrier, wherein said body has an internal groove therein, perpendicular to the axis thereof, surrounding each space, and wherein said valve comprises:

expandable locking means positioned around said seal carriers, in said spaces, said spaces permitting axial movement of said locking means therethrough; and

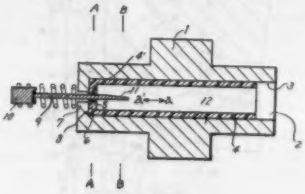
cam means extendable into said spaces, from the ends of said body, between said seal carriers and said locking means, for expanding said locking means into said grooves in said body and wedging said locking means between said grooves in said body and said abutments on said seal carriers thereby axially positioning said locking means between said grooves and said seal carriers to lock said seal carriers in said body.

4,023,774

ORIFICE UNIT OF A NEEDLE VALVE

Hisatoshi Kojima, No. 11-4 Tanabe Amagaike, Tanabe-cho, Tsuzuki, Kyoto, Japan

Filed Aug. 12, 1975, Ser. No. 604,042
Claims priority, application Japan, Aug. 12, 1974, 49-96699[U]
Int. Cl.² F16K *5/12*
U.S. Cl. 251—205 **2 Claims**



1. An orifice valve assembly comprising: a cylindrical orifice unit formed of synthetic resin material and having at one end thereof an end wall with an orifice therethrough, said end wall being of substantially uniform thickness in the axial direction of said orifice unit;

a metallic needle mounted for reciprocation in said orifice, said needle having a cylindrical surface portion in contact with an inner surface of said end wall defining said orifice, said needle having an oblique surface portion defining with said inner surface of said end wall a gap which is variable with reciprocable movement of said needle; and

a metallic holder element having a passage therethrough, said orifice unit being positioned within said passage, said orifice unit having a greater diameter outer portion in contiguous contact with an inner surface of said holder element defining said passage, said orifice unit having a smaller diameter outer portion, formed integrally with said larger diameter outer portion, at a position radially outwardly of said orifice, spaced from said inner surface of said holder element, and said smaller diameter outer portion forming recess means for allowing unconstrained radial expansion and contraction of said end wall due to temperature variations.

4,023,775

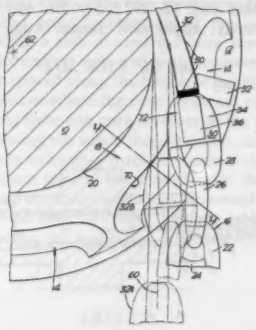
APPARATUS FOR RECOVERING ROPE AND CHAIN CABLE

David Hepburn Beattie, Wylam, England, assignor to Clarke Chapman Limited, Tyne and Wear, England

Filed July 10, 1975, Ser. No. 594,931
Claims priority, application United Kingdom, Aug. 8, 1974, 35101/74
Int. Cl.² B66D *1/36*
U.S. Cl. 254—190 R **11 Claims**

1. In combination, a chain-cable lifter wheel, means for driving said chain-cable lifter wheel, ligament means comprising a chain-cable made up of a plurality of interconnected links, a rope, and a connector connecting an end link of said chain cable to a first end of said rope, a drum which receives a second end of said rope, and means for driving said drum, said lifter wheel having first formations which define a circularly-disposed series of pockets and said lifter wheel having second formations which define an annular groove, said first formations being shaped to enable each said pocket to accommodate a link of said chain-cable, said second formations being shaped to enable said groove to accommodate said rope, said connector being shaped so as to be capable of being

accommodated in any of said pockets and having elements of shape thereon, said first formations including means cooperable with said elements of shape in a first angular orientation of said connector about a lengthwise axis thereof to stop said connector moving relative to said wheel circumferentially thereof beyond first position, said means being cooperable with said elements of shape in second angular orientation of



said connector angularly displaced 90° about said axis from said first orientation to allow said connector to move relative to said wheel circumferentially thereof beyond said first position, whereby relative movement between said connector and said wheel ensures seating of said connector in any one of said pockets and ensures a relationship between said connector and said wheel such that said links of said chain-cable correctly enter said pockets.

4,023,776

PROCESS AND APPARATUS FOR THE PRODUCTION OF CHIPBOARDS, OR LIKE PANELS FROM A MIXED MATERIAL

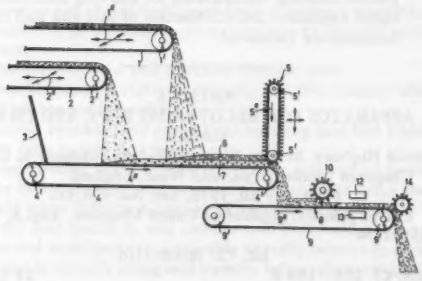
Berndt Greten, Springe, Germany, assignor to Bison-werke Bahre & Greten GmbH & Co. KG, Germany

Filed July 15, 1974, Ser. No. 488,658

Claims priority, application Germany, July 13, 1973, 2335814

Int. Cl.² B01F *13/00*

U.S. Cl. 259—2 **26 Claims**



1. In a charging device for charging a feeding device for feeding a mixed material composed of components having specific gravities differing relatively greatly from one another to a cake-forming machine to form chipboards, fiberboards or the like panels having a substantially uniform specific gravity distribution, said charging device including a chamber for receiving components of said mixed material, said chamber having a discharge opening in a lower portion thereof, discharge means for discharging said mixed material from said chamber through said discharge opening to said feeding device, and supply means for supplying said components to said chamber, the improvement for improving the specific gravity distribution in the panels to be manufactured comprising means mounting and controlling said supply means so that said supply means deposits said components in said chamber in superposed relatively thin layers, said discharge means engaging the leading face of the mass of material formed by the superimposed layers, said discharge means stripping off the material of each layer to facilitate mixing of said material as said material passes out of said discharge opening.

4,023,777

MIXER WITH ROTATING MIXING CONTAINER

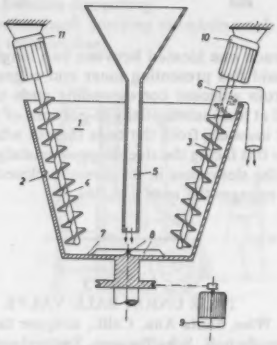
Hans Kimmel, Detmold, Germany, assignor to Gunther Papenmeier KG, Maschinen-und Apparatebau, Detmold, Germany

Filed Nov. 4, 1975, Ser. No. 628,655

Claims priority, application Germany, Apr. 14, 1975, 2516255

Int. Cl.² B01F *15/00, 9/08, 9/10*

U.S. Cl. 259—3 **7 Claims**



1. Mixer having a rotatable container for mixing material and at least two rotatable mixing screws disposed therein and closely adjacent the container wall for sweeping the container wall; a first one of said screws being constructed and rotatable in a manner to convey material within the container in a first direction, a second one of said screws being constructed and rotatable in a manner to convey material within the container in a substantially opposite direction; means for rotatably driving the container and each of the mixing screws at speeds adjustable independently of one another; an input means for said container to introduce material to be mixed having an outlet opening near one end of the interior of the rotatable container; a container output means located adjacent one of the screws and disposed to receive material within the container, which will be conveyed by rotation of that associated screw, and to discharge the received material from the container.

4,023,778

DEVICE FOR MIXING CHEMICAL PRODUCTS WITH TAP WATER

Michel Joly, Villeurbanne, and Jean-Noël Tabet, Lyon, both of France, assignors to Sogemaric, Paris, France

Filed May 29, 1975, Ser. No. 581,721

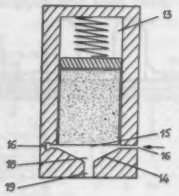
Claims priority, application France, May 31, 1974, 74.19647

Int. Cl.² B01F *15/00*

U.S. Cl. 259—4 R **12 Claims**

1. A device for homogeneously mixing chemical products with water in which the chemical product is embodied in a water-splittable cartridge, said device comprising an enclosure, stop means in the enclosure to subdivide the enclosure into a magazine dimensioned to receive the cartridge and an aligned mixing chamber with one side of the magazine open to the mixing chamber, said stop means retaining the cartridge

within the magazine with a free surface of the cartridge exposed to the mixing chamber, said mixing chamber being formed of a splitting zone and a homogenization zone with the splitting zone adjacent the magazine, an outlet in communication with the homogenization zone, at least one inlet in the splitting zone in crosswise alignment with the interface between the magazine and the mixing chamber for the introduction of water tangentially into the mixing chamber for tangential engagement with the free surface of the cartridge whereby chemical product is split from the cartridge into the splitting zone and homogenized with water in the homogenization zone before issuing from the outlet.

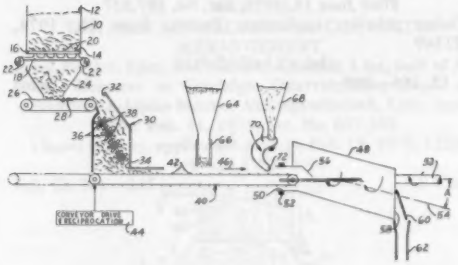


4,023,779

FIBROUS CONCRETE MIXING SYSTEM

Francis J. Beloy, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 9, 1976, Ser. No. 712,556
Int. Cl.² B28C *5/20, 5/40*
U.S. Cl. 259—165 **5 Claims**



5. a fibrous concrete batch forming system, comprising:
- a bin for receiving fibers and having an outlet partially closed by a grate;
- a toothed member in proximity to said grate;
- means for cyclically causing the tooth on said member to enter said bin to extract substantially individual fibers therefrom through said grate;
- a fiber separator having an inlet and an outlet and having a plurality of rotary shafts with intermeshed teeth between said inlet and said outlet for further separating said fibers;
- a first conveyor for receiving said substantially individual fibers and conveying the same to said separator inlet;
- a second, elongated conveyor for receiving said further separating fibers from said separator;
- a rotary mixing drum having an inlet, said drum being mounted for rotation about an axis at an acute angle to its longitudinal axis;

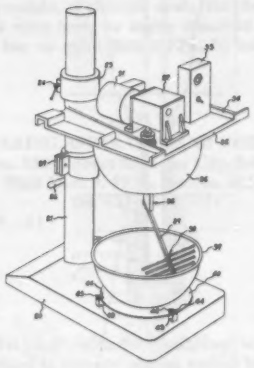
said second conveyor entering said drum inlet; and
- means for depositing predetermined concrete ingredients on said second conveyor.

4,023,780

METHOD OF MIXING AND APPARATUS THEREFOR

Eugene I. Egid, 136 Harrington Ave., Westwood, N.J. 07675

Filed Sept. 3, 1975, Ser. No. 609,958
Int. Cl.² B01F *7/00*
U.S. Cl. 259—102 **15 Claims**



1. A mixer comprising

support means having a base portion adapted to receive a mixing bowl;

head means rotatably mounted on said support means above said base portion thereof;

motor means coupled to said head means for rotation thereof;

guide means pivotally on said head means for oscillative rotation with respect thereto;

eccentric drive means mounted on said head means and spaced from said guide means;

connecting rod means pivotally connected at one end thereof to said drive means and slidably received by said guide means for rotative oscillation of the guide means and slidable oscillation of the rod means relative to the guide means;

mixing paddle means having a paddle portion and an arm portion pivotally connected to said guide means for rotative oscillation therewith and swingable about an axis transverse of the axis of said rotative oscillation, said paddle means arm portion having a first section on which the paddle portion is disposed and a second section which is connected to said guide means with said pivotal connection, said first and second sections being angularly disposed with respect to each other in the plane in which the paddle means swings, the angle between said sections being such that said first section is located for movement through an arc extending on both sides of said axis of rotative oscillation; and

link means pivotally connecting said second section of the paddle means arm portion and the other end of said rod means for oscillative swinging of said paddle means about the swinging axis thereof.

4,023,781
TUYERE FOR METALLURGICAL VESSELS

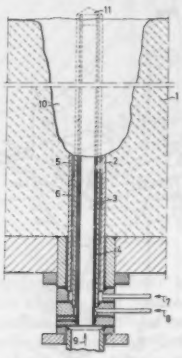
Ernst Fritz, and Hans Georg Fassbinder, both of Sulzbach-Rosenberg, Germany, assignors to Eisenwerk-Gesellschaft Maximilianshutte mbH, Sulzbach-Rosenberg, Germany

Division of Ser. No. 468,774, May 10, 1974. This application Jan. 28, 1976, Ser. No. 652,917

Claims priority, application Germany, May 12, 1973, 2324086

Int. Cl.² C21C 5/48

U.S. Cl. 266—44 **3 Claims**



1. A process for operating a refractory lined refining vessel for the refining of molten metals, wherein at least one stream of refining gas is introduced into a bath of molten metal in said vessel, said refining gas being introduced into said metal together with a sheath of protective media surrounding the stream of refining gas, through a multiple pipe tuyere, and wherein, as a result of the introduction of said refining gas, the mouth of the tuyere and the refractory lining adjacent to the mouth of the tuyere become eroded, threatening the useful life of the refining vessel, the improvement which comprises providing a tuyere which includes a sheath pipe embedded in the refractory lining of the refining vessel and at least two pipes axially slidable inside said sheath pipe for introducing said refining gas and said protective medium into said bath,

and after said refractory lining and said tuyere have been eroded, advancing said axially slidable pipes into said vessel so that they extend into the vessel and project beyond the refractory lining, and applying refractory to build up the worn away lining at least to about the distance to which the axially slidable tuyere pipes project into the vessel.

4,023,782
TUYERE STOCK AND COMPENSATOR JOINT THEREFORE

Gerd Eifer, Radevorwald, Germany, assignor to S.A. des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed Sept. 5, 1975, Ser. No. 610,698

Claims priority, application Germany, Sept. 6, 1974, 2442708; Sept. 6, 1974, 2442709

Int. Cl.² C21B 7/16

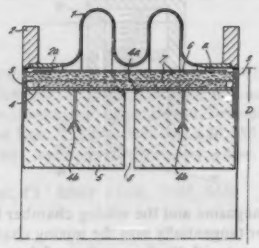
U.S. Cl. 266—186 **20 Claims**

1. An expansion joint device for interconnecting fluid conducting conduits provided with a refractory lining comprising:

open ended expansible bellows means, said bellows means being adapted to be connected at its oppositely disposed ends to the exterior of the conduits to be coupled to render the joint between the facing ends thereof hermetic;

at least a first protective layer of heat resistant material surrounding at least a portion of the outer diameter of extensions of the conduits to be coupled, said first protective layer bridging the joint between the conduits; and

a shielding tube, said shielding tube being spatially displaced from said bellows means and being coaxial with the bellows means and the conduits to be coupled when the conduits are in an undeflected condition, said shielding tube being positioned within the bellows means and radially outwardly with respect to said first protective layer, said shielding tube extending axially in both directions with respect to the joint between the conduits and being supported for movement relative to at least one of the joint defining conduit facing ends.



4,023,783
DEGASING OF LIQUID METALS, IN PARTICULAR OF LIQUID STEEL, BY VACUUM JET

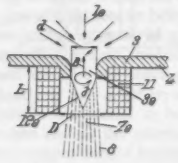
René Moreau, Voiron, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed June 18, 1975, Ser. No. 587,837

Claims priority, application France, June 21, 1974, 74.21569

Int. Cl.² C21C 7/10

U.S. Cl. 266—208 **10 Claims**



1. Method for reducing the cooling of metal and the projections of metal onto the walls in the course of degassing of liquid metals by vacuum jet, which comprises establishing, (in the area of) around the nozzle spout feeding (extending) into the vacuum chamber and beneath said nozzle spout, a magnetic field tending to contract or confine the jet admitted by the nozzle spout into the vacuum chamber.

4,023,784
APPARATUS FOR FEEDING METAL SCRAP INTO MOLTEN METAL

Henry J. Wallace, 570 Squaw Run Road, Pittsburgh, Pa. 15238

Continuation-in-part of Ser. No. 535,444, Dec. 23, 1974, abandoned, which is a division of Ser. No. 403,842, Oct. 5, 1973, Pat. No. 3,871,058. This application June 30, 1975, Ser. No. 591,451

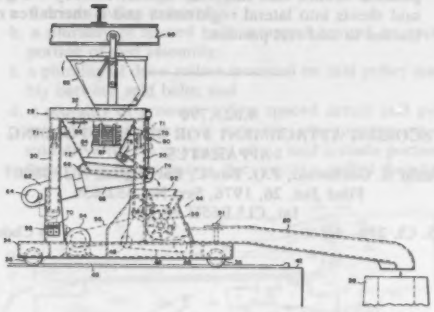
Int. Cl.² C21C 7/00

U.S. Cl. 266—216 **11 Claims**

1. Apparatus for feeding small pieces of metal into a con-

tainer while molten metal is being supplied to said container which comprises a supporting structure,

a hopper for said pieces mounted on said supporting structure, a throwing mechanism for said pieces mounted on said supporting structure, a feeder mounted on said supporting structure below said hopper and above said throwing mechanism and adapted to receive said pieces from said hopper and feed them at a controlled rate to



said throwing mechanism, and a chute closed around its periphery and adapted to receive said pieces from said throwing mechanism and feed them into said container, said chute comprising at its discharge end means for directing said pieces generally downwardly into said container, said pieces being fed to said container at a controlled rate and speed such that the velocity of said pieces is sufficient to enable penetration of the molten metal in said container.

4,023,785

TILTABLE METALLURGICAL CONVERTER ARRANGEMENT

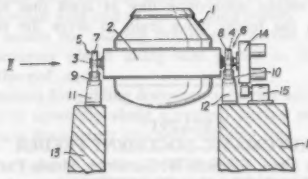
Ernst Riegler, Enns, and Manfred Schmidt, Linz, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Feb. 11, 1976, Ser. No. 657,309

Claims priority, application Austria, Feb. 19, 1975, 1228/75

Int. Cl.² C21C *5/46*

U.S. Cl. 266—245 **8 Claims**



1. A tiltable metallurgical converter arrangement, in particular a steel making converter arrangement, which comprises:

a metallurgical converter vessel,

carrying trunnions tiltably supporting said metallurgical converter vessel,

a fixed bearing and an expansion bearing accommodating said carrying trunnions,

bearing housings enclosing the fixed bearing and the expansion bearing,

load cells for indicating the weight of the contents of the vessel, the bearing housings being arranged upon said load cells,

a supporting construction including sole plate means on which the load cells rest, and

connecting means for accommodating tensile forces being arranged opposite each other in a horizontal plane and securing the bearing housings relative to the supporting construction.

4,023,786

REFRACTORY LINING FOR A PIG IRON CONTAINER

Hans-Jurgen Gulas, Leoben, Austria, assignor to Veitscher Magnesitwerke-Aktiengesellschaft, Vienna, Austria

Filed Sept. 24, 1976, Ser. No. 726,064

Claims priority, application Austria, Oct. 8, 1975, 7707/75

Int. Cl.² C21C *5/44*

U.S. Cl. 266—280 **3 Claims**

1. A refractory lining of a vessel for holding pig iron, comprising bricks of a magnesite-chromite mass containing from 15–30%, by weight, of chromic oxide, the chromite contained in the brick mass being so highly dissolved therein that the brick mass has no more than a 12%, by volume, residue of chromite.

4,023,787

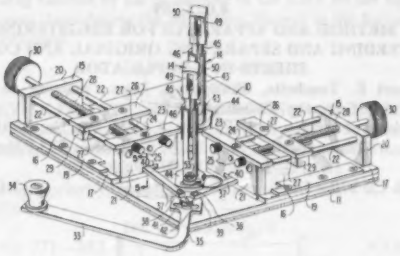
MITERING APPARATUS AND VISE MEANS

Jean Violette, 150 Stewart St., Lake City, S.C. 29560

Filed Mar. 9, 1976, Ser. No. 665,305

Int. Cl.² B25B *5/14*

U.S. Cl. 269—41 **10 Claims**



1. A mitering apparatus comprising a base plate, a pair of vises on the base plate in a fixed angular relationship and each adapted to hold a work piece having a mitered end face, linear guideway means for said vises on the base plate whereby the vises can be bodily shifted in opposite directions along linear paths defined by said guideway means, and a common operator means on the base plate for the two vises and being operatively connected therewith in such a way that the two vises can be simultaneously moved in opposite directions along said linear paths by said common operator means to precision align said mitered end faces of work pieces by sliding the mitered end faces on each other in opposite directions.

4,023,788

DEVICE FOR AUTOMATICALLY SHIFTING A WORKPIECE ON A NIBBLING MACHINE

Eugen Herb, Ditzingen, and Theodor Petera, Stuttgart, both of Germany, assignors to Firma Trumph Maschinene AG, Switzerland

Filed June 28, 1976, Ser. No. 700,339

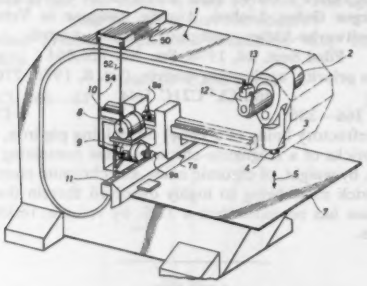
Claims priority, application Germany, July 5, 1975, 2530056

Int. Cl.² B26D *5/20*

U.S. Cl. 269—73 **10 Claims**

1. A device for shifting a workpiece on a nibbling machine having a rotary eccentric shaft which is rotatable to move a nibbling punch into and out of association with a workpiece, comprising a workpiece holder, first motor means connected to said workpiece holder for shifting the workpiece in a longitudinal direction, second motor means connected to said workpiece for shifting said workpiece holder with the workpiece in transverse directions, switch control means con-

nected to said first and second motor means to activate and deactivate said motor means and including a sensor for sensing the thickness of the workpiece, a switch control member for controlling the activation and deactivation of said first and



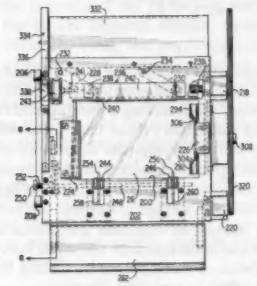
second motor means and an adjusting mechanism connected between said sensor and said switch control member for varying said switch control member and the duration of operation of said first and second motor means.

4,023,789

METHOD AND APPARATUS FOR REGISTERING, FEEDING AND SEPARATING ORIGINAL AND COPY SHEETS IN A DUPLICATOR

Albert F. Touchette, Shutesbury, Mass., assignor to Scott Paper Company, Philadelphia, Pa.

Division of Ser. No. 440,457, Feb. 7, 1974, Pat. No. 3,891,318. This application May 1, 1975, Ser. No. 573,736
Int. Cl.² B65H *39/00*
U.S. Cl. 270—58 **3 Claims**



1. An apparatus for registering a plurality of thin sheets of material of like size comprising:

a frame;

a four-sided carriage for supporting said sheet in superposition thereon, said carriage being mounted for movement on said frame;

first and second stop means for engaging first and seond sides of said sheets disposed adjacent first and second opposite sides of said carriage, said first stop means comprising a fixed protrusion extending upwardly from said first side of said carriage and said second stop means comprising laterally movable means on the second side of said carriage which is movable toward said fixed protrusion;

third and fourth stop means for engaging the third and fourth sides of said sheets and disposed adjacent the third and fourth opposite side of said carriage, said third and fourth stop means being movable relative to each other in response to movement of said carriage on said frame; and

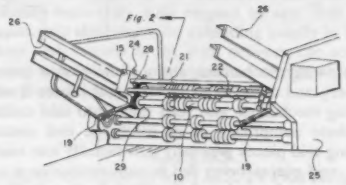
camming means on said frame to cause said laterally movable second stop means to move toward the first stop means in response to linear movement of the carriage on the frame, said camming means comprising a linear cam having a recess formed therein and a cam follower on said laterally movable second stop means for riding into, through and out of said recess in said linear cam as said carriage moves on said frame, whereby said laterally movable second stop means is first moved from a rest position toward said first stop means, thereby bringing said sheets into lateral registration and is thereafter retracted to said rest position.

4,023,790

SCORING ATTACHMENT FOR BUCKLE FOLDING APPARATUS

Donald A. Gortowski, P.O. Box C, Barrington, N.J. 08007

Filed Jan. 26, 1976, Ser. No. 652,636
Int. Cl.² B65H *45/14*
U.S. Cl. 270—68 A **6 Claims**



1. In a buckle-type paper folder of the type having a first folding roller assembly including a plurality of folding roller pairs driven by a folder drive chain and parallel fold pan rails for supporting fold pans adjacent the folding rollers, the improvements of a scoring attachment permitting scoring of paper stock at the beginning of passage of the paper stock through the first folding roller assembly comprising:

two parallel scoring rollers;

a roller supporting frame at each end of the scoring rollers including journal means supporting the rollers between the supporting frames;

securing means for removably supporting the roller supporting frames and included scoring rollers upon the fold pan rails adjacent the folding rollers; and,

roller drive means interconnecting at least one scoring roller with the folder drive train to drive the scoring rollers.

4,023,791

SEMI-AUTOMATIC DOCUMENT FEEDER

Tatsu Hori, Los Altos; Kenneth W. Gardiner, Menlo Park, and Norman F. Mangal, Palo Alto, all of Calif., assignors to Savin Business Machines Corporation, Valhalla, N.Y.

Filed Oct. 23, 1975, Ser. No. 624,860
Int. Cl.² B65H *3/04, 9/06, 29/14*
U.S. Cl. 271—3 **32 Claims**

14. In a photocopying machine having an imaging platen and having a plurality of parallel spaced belts for moving a document from one end to the other end of said platen, apparatus for arresting said document along said one end comprising:

a. an elongated gate member having a plurality of upwardly extending fingers corresponding to the spaces between said plurality of belts;

b. means for mounting said gate member along said one end of said machine platen for translational movement between a first position in which said fingers extend between said plurality of belts and a second position in which said fingers are spaced away from said plurality of

belts, said movement being along a path which is oblique to said one end of said platen;

c. means for normally biasing said gate member in one of said first and second positions; and

d. means for applying an actuating force to said gate member in a direction substantially parallel to said one end to move said gate member into the other of said first and second positions.

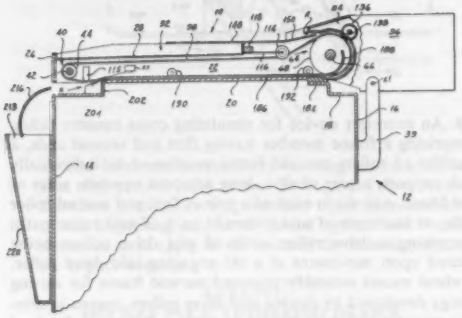
15. Document accepting apparatus comprising:

a. a driven pulley assembly:

b. a plurality of spaced belts wrapped around an arcuate portion of said assembly;

c. a plurality of drive rollers mounted on said pulley assembly between said belts; and

d. a plurality of pressure rollers spaced across said pulley assembly and selectively movable into engagement with said drive rollers at a point along said arcuate portion to form a nip for accepting documents supplied thereto.



29. A document feeder for a photocopying machine having a generally horizontal imaging platen, comprising:

a. a generally horizontal support surface for guiding documents to be copied, said surface being disposed above said imaging platen and having an edge adjacent to an end of said platen;

b. a generally horizontal stacking tray disposed between said imaging platen and said support surface;

c. means for accepting a document moved off said edge and guiding said document downwardly around a first curved path such that the leading edge of said document moves toward said end of the imaging platen;

d. means for moving documents across said end of said imaging platen along said platen to the opposite end thereof; and

e. means for guiding documents moving across said opposite end upwardly along a second curved path to discharge said documents into said stacking tray.

4,023,792

SHEET FEEDING APPARATUS

Frazer D. Punnett, Rochester; Charles H. Schmidt, Jr., Pittsford, and Donald W. Tates, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 205,911, Dec. 8, 1971. This application Jan. 16, 1976, Ser. No. 649,777

Int. Cl.² B65H *3/30*

U.S. Cl. 271—22 **8 Claims**

1. A method of forwarding, along a substantially common path of travel, successively separated sheets from a stack of sheet material, including the steps of:

supporting a feed roll substantially fixedly;

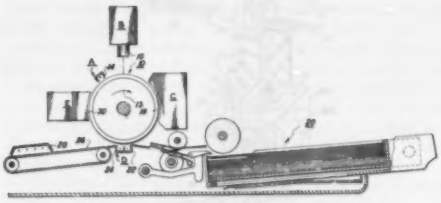
moving the stack of sheet material from a non-feeding position, in which the uppermost sheet of the stack is spaced from the feed roll, to a feeding position, in which the uppermost sheet of the stack engages the feed roll;

rotating the feed roll in a first direction to move the uppermost sheet in a rearwardly direction forming a buckle therein to separate the sheet from the remainder of the stack;

rotating the feed roll in a second direction opposed from the first direction to move the uppermost sheet in a forwardly direction;

aligning the uppermost sheet after a portion thereof moves in a forwardly direction;

returning the remainder of the stack to the non-feed position; and



advancing the uppermost sheet in the forward direction after said step of aligning and substantially simultaneously with said step of returning the remainder of the stack to the non-feed position, thereby minimizing the frictional drag exerted by the remainder of the stack on the uppermost sheet during the movement thereof in the forwardly direction.

4,023,793

DEVICE FOR THE SIDE-REGISTERING OF SHEETS

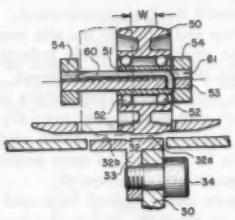
Erich Pietsch, Offenbach-Bieber, Germany, assignor to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Germany

Filed Aug. 4, 1976, Ser. No. 711,581

Claims priority, application Germany, Aug. 6, 1975, 2535062

Int. Cl.² B65H *9/10*

U.S. Cl. 271—252 **4 Claims**



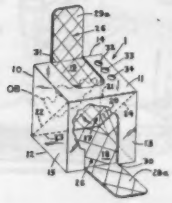
4. In a wiper mechanism for lateral shifting of a sheet into a registered reference position, the combination comprising means defining a sheet supporting surface, a side guide adjacent the supporting surface for engaging and thereby positioning the edge of the sheet, a drive shaft, a wiper member mounted under the supporting surface and having an arcuate sheet-engaging wiper surface engaging the underside of the sheet, means coupled to the drive shaft for rotating the wiper member so that the wiper surface moves outwardly in the direction of the side guide, a tap roller above the wiper surface for pressing the sheet downwardly thereon, a bracket for mounting the roller, means for coupling the bracket to the drive shaft so that the roller is cyclically lowered and raised, the wiper surface having axially adjacent strips surfaced for different amounts of friction, the roller having an effective width corresponding to the width of one of the strips, the roller bracket including provision for axial shifting of the roller into register with a selected one of the strips for changing the degree of friction applied to the sheet depending upon the thickness of the sheet being handled.

4,023,794

OPTICAL ILLUSION DEVICE FOR CONCEALING AN OBJECT, ANIMAL OR THE LIKE TO BE PRODUCED

Joseph H. Adams, Brielle, N.J., assignor to S.S. Adams Company, Neptune, N.J.

Filed Dec. 23, 1975, Ser. No. 643,630
Int. Cl.² A63J 21/00
U.S. Cl. 272—8 M 4 Claims



1. An optical illusion device for providing a compartment to conceal an object, animal and the like to be produced including;

a. box like means having a top, a bottom, and side means connected to the top and bottom,

b. said top, bottom, and side means respectively each having an inner wall means and defining therebetween a space,

c. a reflective means having a reflective surface, and peripheral edges mounted in the box like means transversely of the medial section of said space to divide said space into a first compartment on the side of said reflective means having the reflective surface and a second compartment on the side of the reflective means remote from the reflective surface,

d. a part of the side means and a part of the bottom associated with the reflective surface of the reflective means to define therewith the first compartment,

e. a part of the top and a part of the side means are associated with the remote side of the reflective means to define therewith the second compartment,

f. a first closure means in said side means pivotally connected adjacent said bottom and normally disposed to maintain said first compartment closed, said first closure means movable from closed to open position to permit said first compartment to be viewed.

g. a second closure means spaced from said first closure means in the top pivotally connected adjacent said side means and normally disposed to maintain said second compartment closed, said second closure means movable from closed to open position to permit access to said second compartment,

h. said first closure means and said second closure means sized and shaped substantially identical to each other and movable to open position respectively in opposite directions from each other along a vertical plane which traverses the medial sections of the first compartment, the reflective means and the second compartment,

i. said inner wall means of the bottom, and side means defining the first compartment having a lined design thereon, and

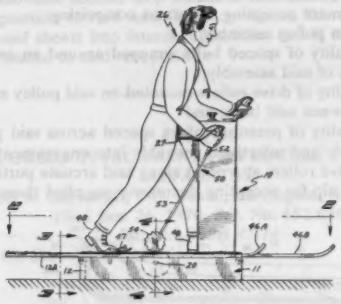
j. the peripheral edges of said reflective means in engagement with the side means and the bottom of said first compartment and disposed for operative association with said lined design on the inner wall means to form part thereof reflected by the reflective surface of said reflective means when said first closure means is moved to open position.

4,023,795

CROSS-COUNTRY SKI EXERCISER

Edward A. Pauls, Rte. 1, Box 615P, Excelsior, Minn. 55331

Filed Dec. 15, 1975, Ser. No. 640,496
Int. Cl.² A63B 69/18
U.S. Cl. 272—97 10 Claims



9. An exerciser device for simulating cross country skiing comprising a frame member having first and second ends, a plurality of rollers on said frame positioned to individually each support, a pair of skis along adjacent opposite sides of said frame, one ski in each of a pair of first and second roller paths, at least one of said rollers in each of said roller paths comprising a drive roller, each of said drive rollers being rotated upon movement of a ski engaging said drive roller, flywheel means rotatably mounted on said frame for storing energy developed by driving said drive rollers, means to drivably connect the drive rollers in each path to said flywheel means including one way clutch means, said one way clutch means being effective to disengage driving connection between each of said drive rollers and when said drive rollers are rotated in one direction of rotation and to effect driving connection between said drive rollers and the flywheel means when said drive rollers are rotated in the other direction at a speed greater than the speed necessary to overtake the rotation of the flywheel means.

4,023,796

VARYING FORCE RESISTING TYPE EXERCISING DEVICE

Kasimir C. Kusmer, Aurora, Ill., assignor to Remsuk Ventures Limited, Burnaby, Canada

Continuation-in-part of Ser. No. 497,714, Aug. 15, 1974, Pat. No. 3,937,462. This application July 9, 1975, Ser. No. 594,367
Int. Cl.² A63B 21/02
U.S. Cl. 272—137 8 Claims

1. An exercising and development apparatus for use with the limbs of an exerciser employing the principle of isotonic exercise combined with the principle of isometric impact exercise comprising:

a frame;

a force resisting means;

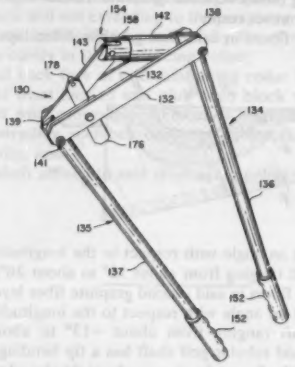
a first lever means being pivotably mounted on said frame and supporting said force resisting means;

a second lever means pivotally mounted on said frame at a point spaced apart from the pivot point of the first lever means;

means connecting the second lever means to said force resisting means, said first and second lever means being pivoted on the frame by the exertion of forces by a first limb of the exerciser on said first lever means and a second limb of the exerciser on said second lever means, said force resisting means offering a varying resistance during the pivoting of said first and second lever means by the exerciser such that as said first and second lever reach

dead-center the force on the force resisting means reaches a maximum value, the pivoting of the lever means providing the limbs of the exerciser with isotonic exercise; and

restricting means for limiting the pivoting of said first and



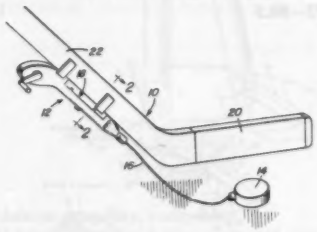
second lever means, the force resisting means after said first and second lever means have passed dead center, then free to exert force against said first and second lever means impacting said lever means against said limiting means so as to apply to the limbs of the exerciser isometric impact exercise.

4,023,797

HOCKEY PUCK TETHERING DEVICE

Maurice O. Sarrasin, 585 Bound Road, Woonsocket, R.I. 02895

Filed Oct. 29, 1975, Ser. No. 627,016
Int. Cl.² A63B *59/14*
U.S. Cl. 273—1 B **8 Claims**



1. In combination with a hockey stick and a hockey puck, a hockey puck handler practice and training device, comprising means for developing stick handling skills including:

a. a tethering line connected to the hockey puck;

b. reel means mounted on the hockey stick and connected to the tethering line, the tethering line being attached to the reel means for permitting the line to vary in length, the reel means further including,

c. a housing provided with a cavity and a passage communicating with the cavity;

d. a spool rotatably disposed in the cavity, the tethering line being wound about the spool;

e. a crank affixed to the spool for facilitating winding of the tethering line onto the spool; and

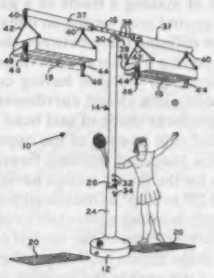
f. cushioning means partially connected to the housing at an opening of the passage from the housing and partially connected to the puck for cushioning extreme forces on the tethering line and preventing the tethering line from separating during use of the device.

4,023,798

TENNIS SERVE TRAINING DEVICE

Alexander Pronin, 1110 W. San Jose, Fresno, Calif. 93704

Filed May 10, 1976, Ser. No. 684,876
Int. Cl.² A63B *61/00*
U.S. Cl. 273—29 A **10 Claims**



7. A tennis training aid comprising:

a frame having ground support means and an overhead support arm disposable above the racquet reach of a tennis player;

height adjustment means interconnected with said frame for adjusting the height of said overhead support arm to correspond to the size of a user;

an overhead target having a planar lower surface with a target pattern thereon;

flexible cord means interconnected between said overhead support arm and said overhead target for suspending said overhead target from said overhead support arm; and

ground target locator means for locating and designating on the ground beneath each of the overhead targets a desired contact point for the fall of a properly tossed serve ball, said ground target locator means being interelated with said overhead target.

4,023,799

GAME RACKET

Richard L. Van Auken, Somerville, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 24, 1974, Ser. No. 436,142
Int. Cl.² A63B *49/10*
U.S. Cl. 273—73 F **12 Claims**

1. A racket comprising: a frame core having a head portion of curvilinear shape defining a striking plane and a handle portion integral therewith, said head portion and handle portion defining a throat section at the junction of the handle and the head portion; a fiber reinforced plastic skin on each of the opposing faces of the head portion of the core parallel to the striking plane, said skin on the head portion of the core having continuous fibers oriented solely in a closed curvilinear pattern following the curvilinear shape of the core in the head portion of the racket whereby circumferential stiffness is imparted to said frame; a fiber reinforced plastic skin on each

of the opposing faces of the throat section of the core, said skin on the throat section of the core overlapping the skin on the head portion of the core only at the junction of the handle and the head portion, said skin on the throat section of the core having fibers oriented at an angle of about ±25° to ±45° as measured from the longitudinal axis of the frame whereby torsional stiffness is imparted to said frame.

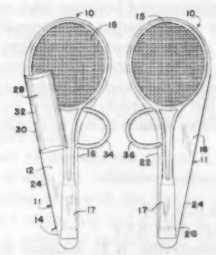
11. The method of making a frame of a game racket comprising: forming a central core having an integral head portion and handle portion defining there between the throat section, said head portion having a generally curvilinear shape; forming a fiber reinforced plastic skin having continuous fibers oriented therein solely in a closed curvilinear pattern following the general curvilinear shape of said head portion bonding said fiber reinforced skin to each of the opposing surfaces of the central core on the head portion; forming a fiber reinforced plastic skin for the throat section having fibers oriented at an angle from ±25° to ±45° as measured from the longitudinal axis of the frame; bonding a fiber reinforced plastic skin to each of the opposing surfaces of the central core in the throat section, said skin in the throat section overlapping the skin on the head portion of the core at the junction of the handle and head portion.

4,023,800

TENNIS RACKET CASE

Patrick E. Haggerty, 3411 E. Kiest Blvd., Dallas, Tex. 75203

Filed Mar. 30, 1976, Ser. No. 672,260
Int. Cl.² A63B *49/18*; B65D *85/00*
U.S. Cl. 273—74 **7 Claims**



1. A tennis racket and ball carrying case comprising: a first side member having at least one flat edge extending along the length of one side thereof; a second side member having at least one flat edge extending along the length of one side thereof; means to pivotally join said first and second side members along correspondingly flat edges; means to disengageably join said side members to close same; ball carrying means comprising a hollow foot member extending outwardly from one of said side members, said foot member having a substantially flat surface formed in the same plane as said flat edges on said first and second side members such that when the case is positioned on the flat edges and flat surface the case will remain upright.

4,023,801

GOLF SHAFT AND METHOD OF MAKING SAME

Richard L. VanAuken, Sommerville, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Sept. 24, 1974, Ser. No. 508,884
Int. Cl.² A63B *53/10*; B32B *5/12*; D03D *13/00*
U.S. Cl. 273—80 B **7 Claims**

1. A tubular golf shaft having narrow range bending and torsional deflections comprising:

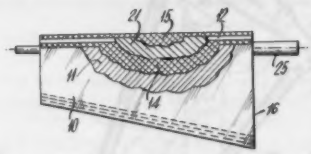
a tapered, scrolled, oblong blank of thin sheet material, said sheet material including a first graphite fiber layer, a second graphite fiber layer and at least a third glass fabric layer;

said third glass fabric layer being woven fiber glass having fibers oriented at an angle of between about ±40° to about ±50° with respect to the longitudinal axis of the shaft;

said third layer being interposed between said first and said second layer;

said first graphite fiber layer and said second graphite fiber layer being unidirectional graphite fibers impregnated with a thermoset resin;

said graphite fibers in said first graphite fiber layer being



oriented at an angle with respect to the longitudinal axis of the shaft ranging from about 13° to about 26°;

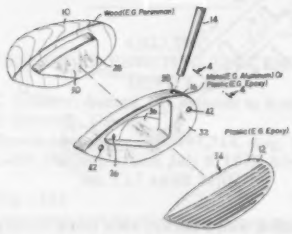
said graphite fibers in said second graphite fiber layer being oriented at an angle with respect to the longitudinal axis of the shaft ranging from about −13° to about −26° whereby said tubular golf shaft has a tip bending deflection under the force of a six pound weight placed one inch from the tip of the shaft of between about 7 and 5 inches and a torque at 1.65 ft. lbs. of between about 8° and about 13°.

4,023,802

GOLF CLUB WOOD

John W. Jepson, Marion; Walter Reid, and Robert A. Brown, both of Mattapoisett, all of Mass., assignors to Acushnet Company, New Bedford, Mass.

Continuation of Ser. No. 511,128, Oct. 2, 1974, Pat. No. 3,985,363, which is a continuation-in-part of Ser. No. 387,760, Aug. 13, 1973, abandoned. This application Mar. 29, 1976, Ser. No. 671,334
Int. Cl.² A63B *53/02*, *53/04*
U.S. Cl. 273—80.5 **10 Claims**



1. A wood type golf club having a club head and a shaft comprising:

a. a club head block of wood, said club head block having a front face and said front face having a periphery;

b. a reinforcing collar having a back face and said back face having a periphery;

c. the reinforcing collar at its back face being substantially the same in peripheral dimension as the peripheral dimension of the club head block at its front face;

d. a face plate integral with the reinforcing collar and positioned opposite said back face, said reinforcing collar and face plate being a unitary one piece structure and being of a plastic material;

e. a cavity in the reinforcing collar, said cavity having a cross-sectional area of at least one half of a square inch, said cavity being positioned in the central portion of the back face of the reinforcing collar internally of the pe-

riphery thereof and not extending to the periphery of the reinforcing collar, and said cavity extending from the back face for a substantial distance into the reinforcing collar to a predetermined distance from the striking face;

f. a protruding member on the central portion of the front face of said club head block, said protruding member being located internally of the periphery of the club head block and not extending to the periphery of the club head block and being of substantially the same dimension as the cavity in the reinforcing collar;

g. said back face of said reinforcing collar being affixed to said front face of said club head block with said cavity and said protruding member in register whereby said protruding member occupies substantially all of said cavity; and

h. a shaft affixed to said reinforcing collar.

4,023,803

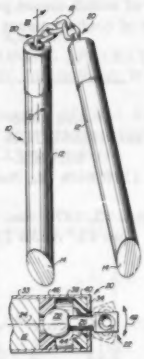
NUNCHAKU

Jack E. Lewis, 2832 S. 46 St., Phoenix, Ariz. 85040

Filed July 7, 1975, Ser. No. 593,756

Int. Cl.² F41B *15/02*

U.S. Cl. 273—84 **11 Claims**



1. Self-defense weaponry, comprising:

a pair of handle members having elongated central axes;

bendable linkage extending between first ends of each of said members;

separate bearing means pivotally mounted to each of said members at said first ends thereof, said linkage secured to said separate bearing means whereby said linkage is rotatable about said central axes to allow relative twisting of said members without twisting said linkage,

each of said bearing means including first and second elements respectively secured to said linkage and the associated handle member, said first element having a pivot section and said second element having a shoulder to retain the pivot section on said associated handle member, said second element further including an annular bearing between said shoulder and said pivot section for rotatably engaging said pivot section; and

a second bearing comprising a segment of relatively soft bearing material disposed between each of said pivot sections and said first ends of the handle members, said segments complementally configured to said pivot sections for rotatably engaging the latter.

4,023,804

SPHERICAL PROJECTILE GAME

Raymond J. Lohr; Richard N. Carver, and James Ray, all of Erie, Pa., assignors to Louis Marx & Co., Inc.

Filed Aug. 29, 1975, Ser. No. 609,114

Int. Cl.³ A63B *65/12*

U.S. Cl. 273—101 **9 Claims**

1. A gaming device comprising, in combination, a substantially planar game board having a playing surface, means for elevating an end of said playing surface relative to an opposed end thereof so as to incline said playing surface, a spherical game piece, means mounted at said opposed end of said playing surface for launching said game piece through a trajectory, a scoring area mounted on said elevated end of said playing surface onto which said game piece is projected, and a rigid transparent dome overfitting said launching means and said scoring area, and said transparent dome having an inner concave surface directed downwardly toward said scoring area and against which said game piece is adapted to strike for rebounding angularly from said concave surface toward said scoring area, said launching means including a projector and a helically wound elevating spiral path associated therewith for receiving a game piece therefrom and for increasing the elevation of the game piece while directing the same along a helical path, said path terminating in an edge from which the game piece travels freely upwardly toward said concave surface from which it is rebounded toward a central portion of said scoring area or various longitudinal and lateral distances therefrom depending upon the force with which the game piece is projected by said projector and the lateral angle it leaves the edge, respectively.

4,023,805

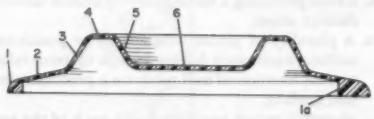
TRICKY DISK

Harry Sherrill, 409 E. 6th St., Irving, Tex. 75060

Filed May 1, 1974, Ser. No. 466,077

Int. Cl.² A63H *27/00*; A63B *65/10*

U.S. Cl. 273—106 B **10 Claims**



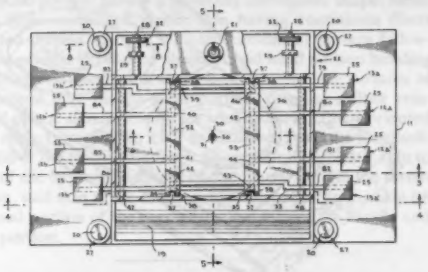
1. An aerodynamic device comprising;

a circular rim comprising inner and outer peripheral margins, the inner margin being eccentrically positioned with respect to the outer margin to form an eccentrically weighted rim of varying radial thickness;

air deflecting surfaces mounted on said rim comprising;

a ring shaped air-deflecting surface extending generally inwardly and upwardly from said rim, and a central surface mounted to the inner edge of said ring.

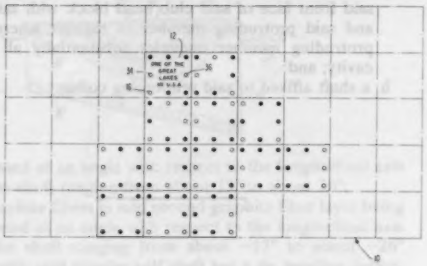
4,023,806
TILTABLE GAME SURFACE DEVICE
John A. Wiser, P.O. Box 192, Liberty, Tex. 77575
Filed Oct. 28, 1975, Ser. No. 625,843
Int. Cl.² A63F 7/16
U.S. Cl. 273—110 **6 Claims**



1. A tiltable game surface device comprising:
a base,
a housing mounted on said base,
a container having a bottom and wall mounted in said housing and movable therein,
a biasing means connecting said container to said base thereby biasing said container toward said base,
a game surface member having a plurality of holes therein and seated into said container, below the top of the wall, such that said container wall encloses said game surface member,
a closure plate slidably mounted to said game surface member and having holes therein alignable with the holes in said game surface member,
a biasing means tending to urge said holes in said closure plate out of alignment with the holes in said game surface member,
a means for actuating said closure plate to align said holes therein with the holes in said game surface member and
at least a first group of four adjacent levers pivotally mounted on said base and extending from said housing and into said housing below said container, said levers being arranged to separately contact points adjacent to the bottom of said container at points at least 60° apart, for individually raising the container at their respective contact points.

4,023,807
ELECTRIC GAME SET
Blaise F. Santianni, 807 Glenview St., Philadelphia, Pa. 19111
Filed Mar. 1, 1976, Ser. No. 662,958
Int. Cl.² A63F 3/00
U.S. Cl. 273—130 AB **2 Claims**

2. An electric game set, comprising:
a. means providing a surface having indicia thereon defining distinct areas;
b. a plurality of pieces adapted to be positioned on said surface, each piece having indicia thereon relating to the correct location of said piece on a predetermined area on said surface;
c. electrical means associated with each of the areas on said surface, said electrical means comprising a signal means and switch means coacting with said signal means to produce a signal upon closing of said switch means; said switch means being engaged with said first mentioned means providing a surface and being proximate to each of said areas; and
d. each of said pieces having contact means associated therewith adapted to coact with said switch means upon appropriate predetermined positioning thereof to close said switch means and thereby to actuate said signal means to produce a signal; the switch means and contact means being arranged with respect to said areas such that said contact means will not coact with said switch means as aforesaid when said piece is correctly positioned with respect to said surface; the prearrangement of switch means and contact means with respect to said areas being such that the switch means associated with each of said

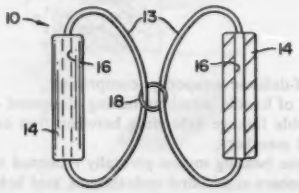


areas, bear a relationship to the contact means associated with each of said pieces to perform the functions as set forth above, in accordance with the following formula

$$x = n!/[(n-m)\,!]m!$$

where:
x = the areas on the board
n = the number of switch means per area
m = the number of contact means associated with each of said pieces.

4,023,808
RESILIENT FORCE RESISTOR TYPE EXERCISING DEVICE
Dalton P. Hebert, 1210 66th St., North, St. Petersburg, Fla. 33710
Filed Jan. 12, 1976, Ser. No. 648,561
Int. Cl.³ A63B 21/02
U.S. Cl. 272—137 **6 Claims**



1. An exercise device of the type primarily designed to develop predetermined portions of the human body, said exercise device comprising: handle means including at least two handle elements disposed in spaced relation to one another; resistance means disposed in interconnecting relation to said two handle elements; resistance connector means integrally formed on each of said handle elements, said resistance means comprising portions thereof disposed in engaging relation with said resistance connector means, said resistance means including at least two elastic elements and interconnecting means disposed in interconnecting relation to each of said elastic elements, each one of said elastic elements disposed in interconnected biasing relation between said attachment means and each of said handle means, whereby separa-

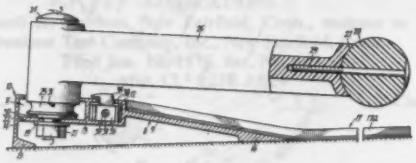
tion of said handle elements from one another causes said elastic elements to exert a force on the handle elements, the interconnecting means, and of the body of the user.

4,023,809

GOLF PRACTISING DEVICE

William Chesterfield Newton, 49 Church St., Middle Brighton, Victoria, Australia

Filed Jan. 22, 1976, Ser. No. 651,590
Int. Cl.² A63B *69/36*
U.S. Cl. 273—184 B **10 Claims**



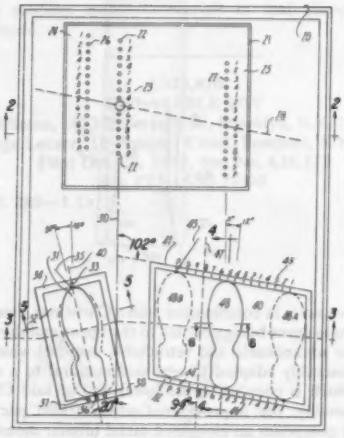
1. A golf practising device including a base, a captive ball secured to a sleeve rotatable on a pillar fixed to the base, a cable winding drum rotatable by said sleeve upon the captive ball being struck by a golf club, a cable anchored to the drum and the free end of a tension member to provide resistance to the winding of the cable on the drum, an indicator movable by the cable in a guideway in said base when the cable is wound upon the drum, and with said indicator arranged to remain in an indicating position after the cable has been unwound from the drum by the tension member.

4,023,810

GOLF TRAINING APPARATUS

Walter R. Lorang, 2239 W. Maple Road, Walled Lake, Mich. 48088

Continuation-in-part of Ser. No. 655,684, Feb. 6, 1976. This application Mar. 22, 1976, Ser. No. 669,257
Int. Cl.² A63B *69/36*
U.S. Cl. 273—186 C **6 Claims**



1. Apparatus for training a player to position his feet at the proper distance apart, at the proper angles, and at the proper locations relative to a ball for the club being used, comprising,

a board

a ball line on said board,

a target foot position on said board lying at an angle between 10° and 30° to a line leading to (a) said ball line from a point off the inside of the heel of said target foot position,

an off-target foot position on said board spaced from said target foot position lying at an angle of 0° to 12° to a line parallel to said ball line;

a scale member on said board at said off-target foot position designating spaced locations of said off-target foot position for a particular club as to sidewise distance from said target foot position, the angle of said off-target foot position to a line parallel to said ball line, and the location of said off-target foot position ahead of, even with, and behind said target foot position;

said foot positions being delineated by foot plates;

longitudinal rocker means on said foot plates;

said foot plates being rockable from side-to-side on said rocker means;

positioning means on said board for angularly locating said rockable foot plates relative to said board and said ball line; and

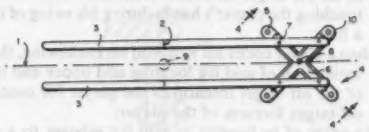
clicker signal means on said foot plates to advise the user of proper and improper rocking of said foot plates.

4,023,811

GOLF SWING TRAINING DEVICE

Louis F. DeCota, 7 Old Mill Lane, Randolph, Mass. 02368

Filed May 19, 1976, Ser. No. 687,658
Int. Cl.² A63B *69/36*
U.S. Cl. 273—186 R **7 Claims**



1. A golf swing practic device comprising a pair of rails a pair of crossed bracket means, securely connected to said rails near one end thereof by connecting means to maintain said rails spaced laterally apart in a constant parallel relationship and allow the head of a golf club to be swung therebetween; and a base, connected to said crossed bracket means at the intersection point thereof by a shouldered fastening means so as to promote free rotation of said rails about said base and including near the extremities of said base feet means, enabling the connection of said base to a stationary surface and the offset of said base from said surface.

4,023,812

GOLF SWING WRIST ACTION TRAINING APPARATUS

Walter R. Lorang, 2239 W. Maple Road, Walled Lake, Mich. 48088

Filed Mar. 15, 1976, Ser. No. 666,881
Int. Cl.² A63B *69/36*
U.S. Cl. 273—186 A **6 Claims**

1. Golf swing training apparatus to demonstrate the addition of the wrist swing of the club to the arm swing of the club by cocking the wrists during the backswing to pivot the shaft at

his hands from a near straight angle relative to his forearms to a near right angle relative to his off-target forearm so when the club head is moving at arm swing velocity in the downswing the wrists can be uncocked to add the velocity of the wrist swing to the velocity of the arm swing at the club head on impact with the ball, comprising,

a leg mountable on a club shaft;

said leg having a forearm contact upper end for contacting a player's off-target forearm;

a lower end on said leg for attachment to a club shaft;

an intermediate portion on said leg between said upper end and said lower end;

mounting means on said lower end for attaching said leg to a club shaft;

said lower end of said leg being mounted on a club shaft spaced below both hands of a player when gripping the club with both hands;

said leg when mounted lying in a plane normal to the plane of the club face in a direction opposite to the target direction,

said leg when mounted inclining from said lower attached end sidewise outwardly and upwardly in the off-target direction to said upper end;

said intermediate portion being of a length to locate said upper end at point approximately opposite the juncture of the player's hands when gripping the club in the ball address position;

the angle of inclination of said leg being such to locate said upper end spaced sidewise outwardly of a player's hands in an off-target direction a distance sufficient to avoid touching the player's hands during his swing of the club at a ball;

when a player cocks his wrists on his backswing, the angle of inclination of said leg locating said upper end in the area of the off-target forearm of the player for contacting the off-target forearm of the player;

the angle of inclination of said leg relative to a club shaft and the length of said intermediate portion of said leg being coordinated to put the said upper end into contact with the off-target forearm of a player when the cock of his wrists angularly positions the club shaft approximately normal to a player's off-target forearm;

when a player cocks his wrists on the backswing, he pivots the shaft from a near straight angle relative to his forearms of the address position to a near right angle position relative to his off-target forearm in the backswing position and said leg on the shaft swings with the shaft and said contact end of said leg moves from a position sidewise of and below the player's forearm into engagement at a near right angle with the player's off-target forearm and shows the player that he has cocked his wrists;

when a player does not cock his wrists, he is shown by lack of engagement by said contact end of said leg with his off-target forearm that he has failed to cock his wrists.

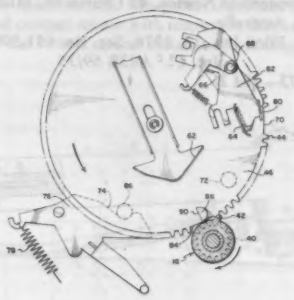
4,023,813

AUTOMATIC RECORD CHANGER WITH CYCLE DELAY TO FACILITATE CHANGING OF THIN, LIGHTWEIGHT RECORDS

James T. Dennis, Oklahoma City, Okla., assignor to James T. Dennis, Oklahoma City, Okla.

Filed Jan. 12, 1976, Ser. No. 648,147
Int. Cl.² G11B 17/12
U.S. Cl. 274—10 R **8 Claims**

1. In an automatic record changer, a rotatable turntable, means for rotating said turntable during both playing and record changing cycles, means for supporting a stack of records above said turntable, a driving gear on said turntable, automatic record changing means including a cycling gear, means responsive to rotation of said cycling gear during a record changing cycle for releasing the bottom record of said stack of records to be rotated by said turntable, driving means on said turntable and arranged to be moved in a predetermined path as said turntable rotates, means for connecting said cycling gear to said driving gear to initiate a record changing cycle, means defining a gap in the periphery of said cycling gear so that said cycling gear becomes disengaged from said driving gear at a predetermined point in the record changing cycle, thereby to provide a slight delay in the record changing cycle which is sufficient to allow said bottom record to break



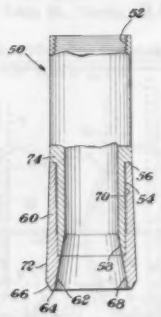
free from the remainder of the record stack, and projection means carried by said cycling gear and arranged to be positioned in said predetermined path of said driving means, said projection means being struck by said driving means as said turntable rotates, said driving gear and said cycling gear being thus re-engaged at the end of said delay to complete the record changing cycle.

4,023,814

TREE SAVER PACKER CUP

Charles A. Pitts, Wichita Falls, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed July 16, 1975, Ser. No. 596,497
Int. Cl.² F16J 15/32
U.S. Cl. 277—181 **1 Claim**



1. A tree saver in combination with a Christmas Tree assembly, said tree saver being coupled to the upper end thereof and having an advanceable and retractable mandrel which has a packer assembly adapted to seal said mandrel to a string of tubing which is coupled to the lower end of said Christmas Tree assembly, the improvement wherein said packer cup assembly comprises an elongated metal tubular member having an outer diameter such that it will fit closely but slideably within said tubing, said tubular member having a first open ended part coupled and sealed against said mandrel, a second end part of reduced outer diameter having a flexible open ended section and an outer wall surface, and a yieldable sleeve including an inwardly tapered unattached end, said sleeve fitting closely over and being bonded to the outer wall surface of said second end part of reduced outer diameter, said sleeve

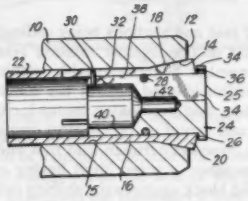
extending substantially beyond said tubular member in the direction away from said first open ended part and having an outer diameter which fits closely but slidably in sealing contact within said string of tubing when said mandrel is advanced therein, the part of said sleeve beyond said tubular member and the open lower end of said second part of reduced outer diameter having an outwardly extending gradually tapered inner wall surface which is of maximum diameter at the end extending beyond said tubular member.

4,023,815

COLLET CHUCK ASSEMBLY FOR CUSTOM APPLICATIONS

Russell H. Dunham, New Fairfield, Conn., assignor to The Dunham Tool Company, Inc., New Fairfield, Conn.

Filed Jan. 12, 1976, Ser. No. 648,460
Int. Cl.² B23B *31/20*
U.S. Cl. 279—46 R **2 Claims**



1. An insert for use with a collet chuck to customize the working dimensions thereof, said insert characterized by
   a. a body comprised of a machinable metal to be received into the bore of a collet;
   b. a plurality of circumferentially spaced longitudinally extending radial slots in said body;
   c. an integral circumferential flange adjacent the front face of said body for engaging the front face of a collet;
   d. a radially extending bore in said body adjacent the rear end thereof;
   e. a pin inserted in said bore and extending therefrom;
   f. a circumferential groove in said body; and
   g. a resilient member received in said circumferential groove.

4,023,816

INFLATABLE TOY

Julius Ellman, 1672 E. Seventh St., Brooklyn, N.Y. 11230, and George Lerner, 12 Prospect Court, Freeport, N.Y. 11520

Filed Oct. 28, 1975, Ser. No. 626,112
Int. Cl.² A63G *19/00*
U.S. Cl. 280—1.13 **12 Claims**

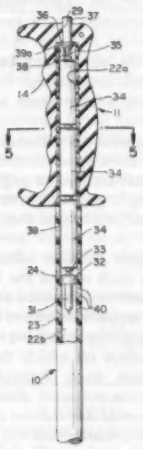
1. An inflatable, rideable toy comprising: a hollow body portion including a forward end, a rearward end and an intermediate central portion that is shaped so that a human may sit thereon; means for inflating said hollow body portion; a rollable forward carriage assembly secured to the underside of said hollow body portion proximate said forward end thereof; and a rollable rear carriage assembly secured to the underside of said hollow body portion proximate said rearward end thereof, at least one of said carriage assemblies including a substantially rigid and transversely extending support member integral with the underside of said hollow body portion, at least one wheel rotatably carried by said support member, an axle member interconnecting said wheel to said support member, and wheel cover means integral with said support member for at least partially covering upper portions of said wheel, said wheel cover means comprising a first partially cup-shaped section having relatively inwardly disposed face surfaces integral with circumferential surfaces which are spaced from outer surfaces of said wheel, said hollow body portion when inflated to a predetermined pressure being sufficiently rigid to substantially support the weight of said human without said intermediate central portion touching the surface upon which said toy rides.

4,023,817

SKI POLE WITH WARNING DEVICE

Josef Lah, 31020 Meadowbrook Drive, Willoughby Hills, Ohio 44094, and Anthony M. Gentile, 25080 Edgemont Drive, Richmond Heights, Ohio 44124

Filed Aug. 29, 1975, Ser. No. 609,024
Int. Cl.³ A63C *11/22*
U.S. Cl. 280—11.37 B **3 Claims**



1. A ski pole having an upper handle end portion and a lower basket end portion;
   said handle end portion being tubular and affording a socket which opens at the upper end of said pole;
   said basket end portion being solid;
   said socket being defined by a peripheral wall;
   said wall having a radially inwardly projecting step spaced axially inwardly from the upper end of said pole and external screw threads disposed on said upper handle end portion;
   a signal device disposed within said socket and retained against downward movement by said step;
   signal energizing means disposed in said socket above said signal device;
   a handgrip having an internally threaded cavity whereby said handgrip is detachably thread fitted to said handle end portion;
   a manually movable actuator member carried by the upper end of said handgrip, said energizing means responsively connected to said actuator member for causing said energizing means to actuate said signal device;

said wall including means affording transmission of said signal outwardly of said ski pole, and

said signal device is adapted to produce a visual warning signal in response to movement of said actuator member.

4,023,818

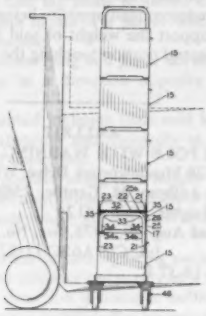
TOTE BIN FOR HIGH DENSITY ARTICLES AND MATERIAL HANDLING SYSTEM

Robert J. Troller, Madison, Wis., assignor to Coolant Equipment Corporation, Verona, Wis.

Filed June 11, 1976, Ser. No. 694,953

Int. Cl.² B62B *5/00*

U.S. Cl. 280—79.1 **7 Claims**



1. A portable tote bin which may be stacked in vertical registry with similar bins, comprising:

a. a tray section having a front panel, a bottom panel, and a rear panel;

b. an inverted-U-shaped support handle extending upwardly from each end of the tray section, each handle having a generally horizontal transverse segment with an upper surface and having a pair of vertical segments each of which has a base affixed to said tray section in supporting relation;

c. a channeled support member affixed to and extending downwardly from each end of the tray section for supporting the tray section in spaced relation to the bottom of the channeled support members and permitting insertion of power lifting apparatus between the tray section and any plane surface on which the channeled support members might rest, each channeled support member having internal cross-sectional dimensions greater than the external horizontal dimensions of the handles to permit the handles of a similar tote bin to be inserted within the channeled support members, and having internal vertical dimensions less than the vertical distance from the upper surface of the handle transverse segments to the upper edge of the tray;

d. said channeled support members having outer sides which extend upwardly to the top edge of the tray and which are affixed to the tray to provide closed ends therefor.

4,023,819

SPRING-LOADED ADJUSTABLE LENGTH CARGO ROD

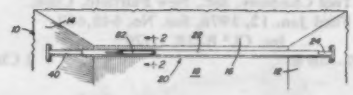
Robert E. Holman, Jr., 11400 E. Ricks Circle, Dallas, Tex. 75227

Filed Nov. 11, 1975, Ser. No. 630,884

Int. Cl.² B60P *7/14*

U.S. Cl. 280—179 A **3 Claims**

1. In combination with opposing spaced surfaces, an adjustable length member for shoring a partial load relative to said surfaces, said member including an elongated tubular center section, a first end section telescopingly engaged with one end of said center section for extension and retraction relative to the latter, said first end section and said one end of said center section including coacting latch means operative to releasably latch said first end section in predetermined extended positions relative to said one end of said center section, a second end section telescopingly engaged with the other end of said center section for extension and retraction relative to said center section, and elongated abutment member mounted within said center section for adjustable shifting therealong, spring means operably connected between said abutment member and second end section yieldingly biasing the latter away from said abutment member, positioning means operably connected between said center section and the abutment member for selectively positioning said abutment member along said center section, said abutment member and the



adjacent ends of said end sections being slidingly telescoped within said center section against rotation relative thereto, said abutment member being adjustable within said center section to a position abutted against the inner end of said second end section, said positioning means including a block mounted within said center section against displacement relative thereto and disposed between said first end section and said abutment member, a screw shaft having one end journaled through said block against axial shifting relative thereto, said screw shaft extending longitudinally of said center section and having its other end threadedly engaged with the adjacent end of said abutment member, a transverse operating shaft journaled through said second section between said abutment member and said first end section, and meshed beveled gears mounted on said screw shaft and operating shaft.

4,023,820

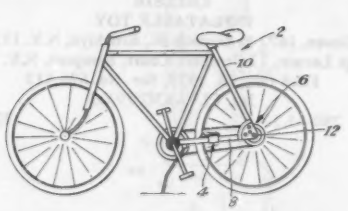
TIRE REMOVING DEVICE AND METHOD

Catherine L. Rizzo, 1641 NW. 8th Ave., Fort Lauderdale, Fla. 33311, and Joseph Rizzo, 291 NE. 38th St., Apt. 4, Oakland Park, Fla. 33334

Continuation-in-part of Ser. No. 489,801, July 18, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,422

Int. Cl.² B62K *3/02;* **B60C** *25/02*

U.S. Cl. 280—288 **5 Claims**



3. A vehicle frame comprising in combination,

a tire iron,

a tire iron connecting means fixed to the vehicle frame in a stationary manner, said tire iron connecting means including a tire iron positioning means to position said tire iron in a working position between an adjacent tire and the rim of the adjacent tire to remove the tire from the rim of the wheel, whereby the wheel movably connected to the vehicle may be rotated about its axis in a normal manner while the tire iron is held in said working position so that the tire iron may remove at least a portion of the tire from the rim of the wheel, and

a movable fork means connected between the vehicle frame

and one end portion of the vehicle wheel axle for providing a tire and tube removal space between the vehicle frame and one end portion of the axle.

4,023,821

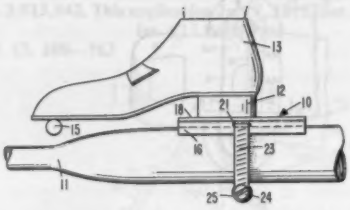
HEAT SHIELDING FOOT REST FOR ATTACHMENT TO A MOTORCYCLE EXHAUST SYSTEM

John H. Eiland, 1611 Ballard St., Silver Spring, Md. 20910

Filed Apr. 5, 1976, Ser. No. 673,879

Int. Cl.² B62J *25/00*

U.S. Cl. 280—291 **10 Claims**



1. An attachment for protecting the heel of a motorcycle passenger's shoe, wherein the attachment is secured to an exhaust system of a motorcycle, and functions in combination with a support, upon which the sole of the passenger's shoe rests in order to support the passenger's foot, said attachment comprising:

a plate upon which the passenger's heel rests;

means for retaining said plate on the exhaust system; and

spacing means for maintaining a spaced relation between said plate and the exhaust system to discourage heat transfer between the exhaust system and plate.

4,023,822

COUPLING HOOK FOR A GUIDE MEMBER OF A TRACTOR THREE-POINT ATTACHMENT

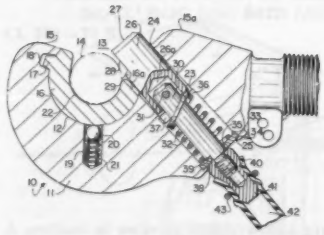
Hubert Geisthoff, and Clemens Nienhaus, both of Lohmar, Germany, assignors to Jean Walterscheid GmbH, Lohmar, Rhineland, Germany

Filed Apr. 29, 1976, Ser. No. 681,710

Claims priority, application Germany, Feb. 28, 1976, 2608276

Int. Cl.² B60D *1/10*

U.S. Cl. 280—508 **7 Claims**



1. A coupling hook for a guide member of a three-point attachment of a tractor comprising a hook member having an opening to receive a coupling pin on an implement to be coupled, there being a bore in said hook member opening into said hook opening, a latch bolt within said bore and displaceable into said hook opening in the locked position, a locking bolt in said bore pivotally connected to said latch bolt and having a locking surface thereon, spring means acting upon said locking bolt in a direction intersecting the axis of said locking bolt, and abutment means engageable by said locking surface under the action of said spring to retain said latch bolt in the locked position.

4,023,823

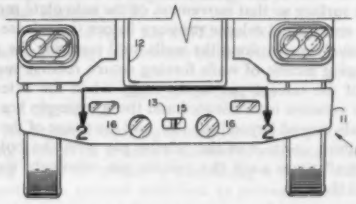
CENTER TOW PIN ASSEMBLY

James Warren Saunders, Milpitas, Calif., assignor to PACCAR Inc, Bellevue, Wash.

Filed June 7, 1976, Ser. No. 693,330

Int. Cl.² B60D *1/02*

U.S. Cl. 280—515 **9 Claims**



1. A towbar receiving assembly for a truck having a frame and having a generally flat front bumper assembly connected to the frame, upper access to the space behind the bumper assembly being blocked by apparatus above the bumper assembly, comprising:

a tow eye box connected to the back side of the bumper assembly adjacent to an opening through the bumper assembly, said tow eye box including an upper and a lower plate defining upper and lower vertical pin-receiving openings positioned generally on a vertical line directly behind the bumper assembly opening, at least the upper of said openings being generally circular with at least one radially outwardly extending slot, and

a generally dowel-shaped towbar pin having at least one radially outwardly projecting tab at its upper end and a handle at its lower end, said pin being sized to be received upwardly through the pin-receiving openings of the tow eye box, with close tolerance at the upper opening and with the tab aligned with the slot as the pin enters the upper opening,

said tow eye box also including means for locking the towbar pin in a position with the tab rotationally spaced from the slot when the pin is pushed through the upper opening and rotated.

4,023,824

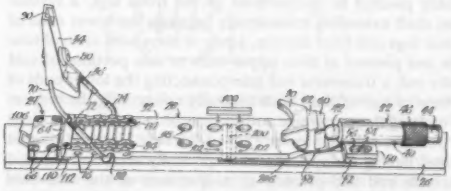
SKI BINDING APPARATUS

Kurt von Besser, 218 S. Hoyne Ave., Chicago, Ill. 60612

Continuation-in-part of Ser. No. 263,295, June 15, 1972, Pat. No. 3,874,685, and a continuation-in-part of Ser. No. 338,595, March 6, 1973, Pat. No. 3,876,218. This application Feb. 10, 1975, Ser. No. 548,679

Int. Cl.² A63C *9/08*

U.S. Cl. 280—618 **16 Claims**



1. A ski binding for releasably securing a ski boot to a ski, comprising:

sole plate means securable to the ski boot and having an upright member mounting a replaceable arcuate socket

including mounting means for replaceably securing the socket to the member and a recess surface with a side wall extending at a sloping incline outward from a nadir to a rim and a bottom wall extending at a sloping incline outward from the nadir to the rim, the lateral extent of the side wall being more than twice the vertical extent of the bottom wall, and the rim surrounding the side wall and the bottom wall has a generally eliptical shape with the rim in the vicinity of the bottom wall sloping vertically upward towards the side wall,

a release unit mountable on the ski including a release pin biased into mating engagement with the nadir of the release surface so that movement of the sole plate means due to an external release pressure forces the release pin to relatively move along the walls until reaching the rim, the sloping incline of walls forcing return relative movement of the release pin to the nadir when the external release pressure is terminated and the release pin has not relatively moved beyond the rim, and the shape of the rim maintaining contact of the release pin with the bottom wall at all times until the release pin relatively moves beyond the rim.

4,023,825

STROLLER

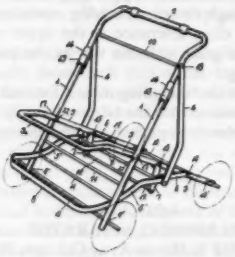
Kenzo Kassai, Osaka, Japan, assignor to Kassai Co., Ltd., Osaka, Japan

Filed Oct. 29, 1975, Ser. No. 626,920

Claims priority, application Japan, Nov. 2, 1974, 49-126813

Int. Cl.² B62B *7/06*

U.S. Cl. 280—649 **3 Claims**



1. A collapsible stroller frame comprising a pair of parallel front legs, a wheel shaft extending transversely between the lower ends of the legs and fixed thereto, an inverted U-shaped handle rod foldably connected to the upper ends of the front legs, a pair of parallel rear legs extending crosswise of and foldably pivoted to midportions of the front legs, a further wheel shaft extending transversely between the lower ends of the rear legs and fixed thereto, a pair of stays bent at an obtuse angle and pivoted at their upper ends to side portions of said handle rod, a transverse rod interconnecting the lower ends of the stays, a pair of links each pivotally connecting the respective ends of the transverse rod to the corresponding rear legs at a position near the lower ends of the rear legs, a U-shaped footrest having its opposite ends pivotally mounted on said transverse rod and pivoted at midportions of the side bars thereof to the front legs near the lower ends thereof, said frame being collapsible from an erected position to a collapsible position, and locking means engageable between at least two of the pivotally connected parts of said frame for locking said frame in the erected position.

4,023,826

TONGUE PLATE SLIDABLY FITTED ON SAFETY SEAT BELT IN MOTOR VEHICLE

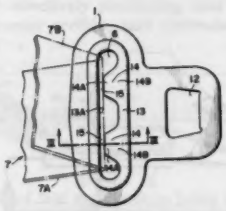
Yukio Kokubo, and Mitsuo Inukai, both of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Sept. 18, 1975, Ser. No. 614,518

Claims priority, application Japan, Sept. 27, 1974, 49-117579[U]

Int. Cl.² A62B *35/00*

U.S. Cl. 280—747 **6 Claims**



1. A tongue plate for a safety belt means having an engaging portion for locking engagement with a buckle device on one end thereof and a slotted opening providing for the passage of a continuous webbing on the other end thereof, characterized in that said slotted opening is provided with at least one resilient projection offset with respect to the middle of the depth of said opening formed along one longitudinal enlongated edge of the tongue plate at the upper portion thereof, said projections extending inwardly from said upper portion in the direction of the thickness of the webbing and defining a space between said projections and the opposite longitudinal elongated edge of said slotted opening having a width not greater than the thickness of said webbing to retain said webbing between said projections and opposite edge of said slotted opening.

4,023,827

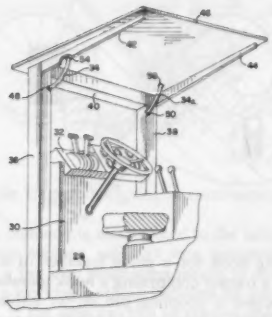
OPERATOR POSITIONING GRAB HANDLES

Charles V. Matalonis, Brookfield, and Edward A. Bott, Crystal Lake, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Continuation of Ser. No. 507,039, Sept. 16, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,733

Int. Cl.² B60N *3/02*

U.S. Cl. 280—756 **4 Claims**



1. A tractor having an operator's station including a deck, an overhead protective structure steering and control levers, an operator's seat centrally located, and a ladder secured to said vehicle extending upwardly to said operator's station wherein the improvement comprises: at least two interior grab

handles secured to said protective structure above and slightly in front of said seat and lying within major planes angled toward each other and intersecting behind said seat for grasping by an operator while maneuvering himself generally vertically with regard to said seat with minimal leg effort.

4,023,828

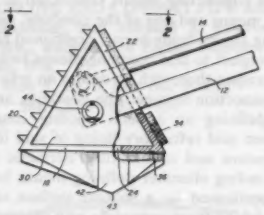
STABILIZER PAD FOR EARTHMOVING APPARATUS

Robert A. MacKenzie, 181 Morton St., Stoughton, Mass. 02072, and Andry Lagsdin, Lot No. 4, King Hill Road, Hanover, Mass. 02339

Continuation-in-part of Ser. Nos. 342,684, March 19, 1973, Pat. No. 3,897,079, and Ser. No. 391,043, Aug. 24, 1973, Pat. No. 3,913,942. This application July 7, 1975, Ser. No. 593,699

Int. Cl.² B60S 9/02

U.S. Cl. 280—763 4 Claims



1. In combination with a support arm of an earthmoving apparatus, a stabilizer pad comprising a piece having a cut-out opening and alternate ground engaging surfaces including one which has resilient means associated therewith and another which is rigidly connected to said one surface, means pivotally supporting said piece to the arm spaced a distance from the end of the arm with the cut-out opening permitting revolution of the piece relative to the arm through substantially one half revolution, the end of said arm forming an extension from the pivot point, whereby in a first position of the piece the resilient means engages the ground with the arm end above the resilient means, and in a second position, substantially one half revolution from the first position, the extension is for engaging with softer ground with the other surface of the piece being maintained above the extension and forming a limiting means to limit ground penetration of the extension.

4,023,829

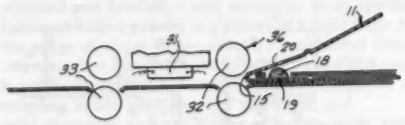
HOT MELT ADHESIVE DOT BINDING

Henry N. Staats, Deerfield, Ill., assignor to General Binding Corporation, Northbrook, Ill.

Filed Mar. 17, 1975, Ser. No. 558,895

Int. Cl.² B42C 9/00; B42D 1/00

U.S. Cl. 281—21 R 2 Claims



1. A method of securing sheets with a prepunched hole pattern to a cover having first and second leaves folded together comprising the steps of:

a. depositing hot melt units having a convex-shaped upper surface into adhesive contact with said first leaf according to said hole pattern, said units projecting upwardly substantially above said first leaf;

b. positioning said sheets on said first leaf with said prepunched holes in alignment with and surrounding said adhesive units, the diameter of said holes being larger than the largest diameter of said hot melt units;

c. folding said second leaf over into contact with tops of the convex-shaped upper surfaces of said adhesive units, said convex tops extending above said prepunched holes; and

d. heating said tops to flatten said convex tops to form an adhesive contact between said flattened tops of the adhesive units and said second leaf.

4,023,830

PRODUCTION OF IMAGES

James Kenneth Skelly, Wilmslow, and James Harry Astbury, Stockport, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

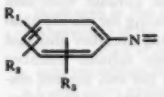
Filed Apr. 23, 1975, Ser. No. 571,036

Claims priority, application United Kingdom, Apr. 25, 1974, 18199/74

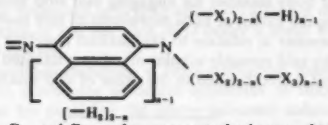
Int. Cl.² B41M 5/22

U.S. Cl. 282—27.5 16 Claims

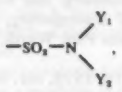
1. An image producing system which comprises a substrate having printed on at least a portion of a surface thereof an ink having a pH of about 7, containing a liquid alkanolamine present in an amount sufficient to prevent reaction between the color former and the substrate on which the ink is printed and a color former of the formula I



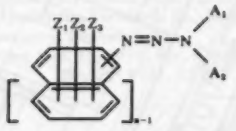
(I)



in which R_1, R_2 and R_3 each represents hydrogen, halogen, alkyl, alkoxy, aryloxy, alkoxycarbonyl, dialkylaminocarbonyl, acylamino, acyl(alkyl)amino,



in which Y_1 and Y_2 each represents alkyl or aryl, or in which Y_1 and Y_2 together represent an alkylene group; X_1 is hydrogen or an alkyl group, X_2 is an alkyl, cyanoalkyl or arylmethylene group or X_1 and X_2 together represent an alkylene group, X_3 is an alkyl or aryl group and n is 1 or 2, or of the formula II



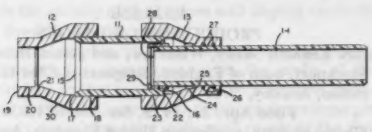
(II)

in which Z_1, Z_2 and Z_3 each represents hydrogen, alkyl, substituted alkyl, alkoxy, halogen, nitro, acylamino, aminoacyl or alkoxycarbonyl, A_1 and A_2 each represents alkyl or phenyl or A_1 and A_2 together with the nitrogen atom to which they are bound form a heterocyclic ring system and n is 1 or 2 and which system also comprises a carrier material impregnated with a solution of an organic acid in a weakly volatile solvent having a boiling point of a least 150° C and insofar as a color former of the formula II is used, the carrier is also impregnated with an azo coupling component.

4,023,831
PLASTIC PIPE FITTING

Dexter Mac Arthur Thompson, Elkton, Md., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 26, 1974, Ser. No. 527,352
Int. Cl.² F16L *21/02*
U.S. Cl. 285—31 2 Claims



1. A pipe fitting of organic thermoplastic polymeric material for joining two spaced pipe ends comprising

a tubular body member;

a first coupling member integrally bonded to one end of said tubular body member and adapted to be integrally bonded to one of said spaced pipe ends;

a second coupling member integrally bonded to the other end of said tubular body member and having sealing means and stop means carried thereby and disposed therewithin; and

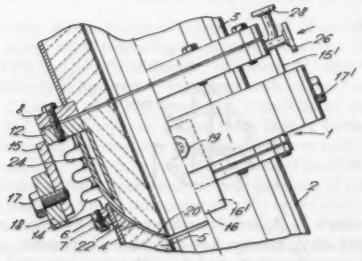
a movable tubular member in slidable contact with said second coupling member and said sealing means for axial movement within said second coupling member and said tubular body member, said movable tubular member having an annular flange secured to the end thereof disposed within said second coupling member and said tubular body member for engaging said stop means for limiting the extent of axial movement of said movable tubular member in relation to said second coupling member,

whereby said movable tubular member is adapted to be moved adjacent to and bonded to the other of said spaced pipe ends.

4,023,832
APPARATUS FOR THE TRANSMISSION OF HEATED FLUID

Edouard Legille, Luxembourg, and René N. Mahr, Howald-Hesperange, both of Luxembourg, assignors to S.A. des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed Sept. 16, 1975, Ser. No. 613,888
Claims priority, application Luxembourg, Sept. 18, 1974, 70943
Int. Cl.² F16L *53/00*
U.S. Cl. 285—41 8 Claims



1. In apparatus for use in the transmission of heated fluid from a supply to a furnace, the apparatus including serially coupled conduits lined with refractory material, an improved coupling for the conduits comprising:

intermediate conduit means positioned between facing ends of the conduits, said intermediate conduit means having a refractory lining, a first surface of said lining defining a fluid flow passage having an axis;

flexible hermetic coupling means extending between exterior surfaces of the conduits, said flexible coupling means including a bellows-type element hermetically joined to and extending between a pair of collar means, one of said collar means being mounted on said intermediate conduit means, said collar means being respectively connected to the conduits whereby said bellows-type element and said collar means form a fluid tight connection between the conduits, said bellows-type element being generally coaxial with the fluid flow passage defined by said intermediate conduit means lining, said flexible coupling means bellows element being spatially displaced from said intermediate conduit means refractory lining in a direction generally radially outwardly with respect to said fluid flow passage axis;

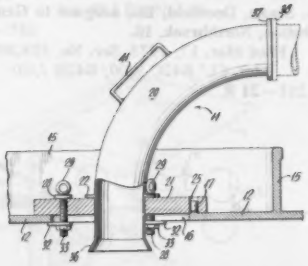
universal connecting means connected to said one of said collar means and one of the conduits, said universal connecting means being in part positioned radially outwardly with respect to said coupling means bellows element and cooperating therewith to define an articulated mechanical connection between the conduits; and

means defining an annular cooling chamber positioned between said refractory lining of said intermediate conduit means and said flexible hermetic coupling means, said cooling chamber defining means having a first wall juxtapositioned to a second surface of the refractory lining which faces outwardly with respect to the fluid flow passage, said cooling chamber defining means having a second wall positioned outwardly from said first wall whereby a passage for the flow of a coolant is in part defined by said first and second walls, said coolant flow passage having an axial length at least as great as the corrugated portion of said flexible coupling means bellows element.

4,023,833
ELBOW COUPLER

Terry P. B. Wellard, Pointe-a-Pierre, Trinidad and Tobago, assignor to Texaco Trinidad, Inc., Pointe-a-Pierre, Trinidad and Tobago

Filed Apr. 27, 1976, Ser. No. 680,931
Int. Cl.² F16L *41/00*
U.S. Cl. 285—179 1 Claim



1. Elbow coupler for use in filling petroleum cargo tanks having a hatch opening surrounded by a coaming, comprising in combination

an arcuate shaped conduit extending solely about 90 °,

an integrally attached skirt located on and adjacent to one end of said conduit and adapted for closing said hatch opening around the outside of said conduit,

a plurality of holes in said skirt for matching engagement with studs located around said hatch opening,

quick release means associted with said skirt and comprising a plurality of toggle bolts with means for engaging the

edges of said hatch opening when said conduit and skirt are in place over said hatch opening,

a flared edge on said conduit at the end next to said skirt to reduce splashing,

a flange on the other end of said conduit from said flared edge,

said flange being adapted for coupling a cargo hose thereto,

said arcuate conduit having a radius sufficient to raise said flange above said coaming when the coupler is in use, and

a handle on the upper surface of said conduit for manually transporting the coupler from one hatch to another.

4,023,834

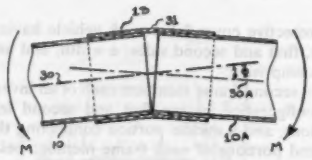
PUSH-TYPE COUPLING AND CONDUIT PIPE ASSEMBLY

Lloyd Ewing, Milwaukee, and Michael J. Bykowski, West Bend, both of Wis., assignors to Ewing Engineering Company, Milwaukee, Wis.

Filed May 2, 1975, Ser. No. 574,117

Int. Cl.² F16L *21/00*

U.S. Cl. 285—235 **42 Claims**



1. A push-type coupling:

a. said coupling, when viewed in transverse cross-section, defining a closed, convexly rounded figure with a length to D ratio in the range of about ½ to about 2 and a wall thickness in the range of about 0.006 D to about 0.09 D, wherein D is the diameter in inches of the pipe for which the coupling is intended;

b. said coupling having

1. an inner surface having a coefficient of friction, relative to the material of said pipe, of at least about 0.7,

2. a column expansibility of at least about 1×10^{-4} inches per pound, and

3. a pull-out resistance of at least about 100 D pounds;

c. said coupling including a fiber-reinforced elastomer composite containing sufficient quantities of fiber and elastomer for providing the above-indicated column expansibility and pull-out resistance,

1. said fiber having a modulus of at least about 6×10^6 psi, oriented and bonded in said elastomer in an opposed, balanced helical pattern or patterns at a helix angle θ in the range of about 45° to about 75°, measured from a reference line parallel to the coupling axis, which angle is substantially uniform throughout the length of the coupling in any given layer of said fiber, and

2. said elastomer being a binder of substantially lower modulus than said fiber having a modulus of at least about 25 psi at 100% elongation and at least about 50 psi at 300% elongation, a tensile strength of at least about 300 psi, and a Shore A durometer hardness in the range of about 15 to about 90, for mechanically interconnecting the opposed fiber pattern or patterns at the above-indicated helix angle,

whereby said coupling will enlarge to receive the end of a rigid pipe which is pushed into it and generate pull-out resistance which is in response to and in proportion to pull-out force and which is substantially in excess of that which would be provided by the mere hoop-stress elasticity of the elastomeric material.

4,023,835

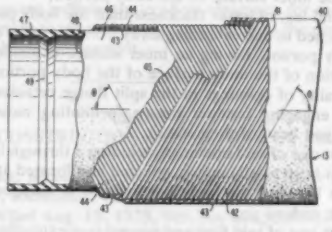
CONFORMABLE THIN-WALL SHEAR-RESISTANT COUPLING AND PIPE ASSEMBLY

Lloyd Ewing, Milwaukee, and Michael J. Bykowski, West Bend, both of Wis., assignors to Ewing Engineering Company, Milwaukee, Wis.

Filed May 2, 1975, Ser. No. 574,118

Int. Cl.² F16L *21/00*

U.S. Cl. 285—235 **64 Claims**



1. A conformable push-type shear-resistant pipe coupling;

a. said coupling, when viewed in transverse cross-section, defining a closed convexly rounded figure with a wall thickness in the range of about 0.006 D to about 0.09 D, wherein D is the diameter in inches, of the pipe for which the coupling is intended;

b. said couplings having

1. a column expansibility of at least about 2×10^{-4} inches per pound, and

2. a shear resistance providing about 0.12 inches of pipe deflection or less per inch of D under a shear load of 150 D pounds,

c. said couplings including a fiber-reinforced elastomer composite containing sufficient quantities of fiber and elastomer for providing the above-indicated column expansibility and shear resistance, said composite including:

1. fibers having a modulus of at least about 6×10^6 psi, oriented in an opposed, balanced helical pattern or patterns at a helix angle in the range of about 45° to about 75°, measured from a reference line parallel to the coupling axis, which angle is substantially uniform throughout the length of the coupling in any given layer of said fibers, and

2. elastomeric binder of substantially lower modulus than said fibers having a modulus at 100°% elongation of at least about 25 psi, a tensile strength of at least about 300 psi, and a Shore A durometer hardness in the range of about 15 to about 90, for mechanically interconnecting the opposed fibers at the above-indicated helix angle.

4,023,836

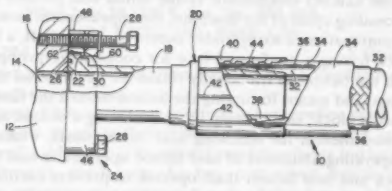
SPLIT FLANGE RETAINER FOR FLANGED CONDUITS

Edward A. Applehans, Rockford, Ill., assignor to The Gates Rubber Company, Denver, Colo.

Filed Dec. 15, 1975, Ser. No. 641,199

Int. Cl.² F16L *23/00*

U.S. Cl. 285—368 **9 Claims**



1. A split flange retainer segment adapted to cooperatively

engage the flanged head of a conduit for mounting the same, comprising:

a body portion of a given thickness and having an inner surface defined by adjacent upper and lower surfaces interconnected by a stepped shoulder, the shoulder adapted to engage said flanged head of the conduit for mounting;

a first leg, of lesser thickness than the body portion and attached to and extending away from one end of the body portion, having an inner surface extending from a portion of the inner surface of the body portion;

a second leg, of lesser thickness than the body portion and attached to and extending away from the other end of the body portion, having an inner surface extending from a portion of the inner surface of the body portion;

a plurality of openings in the split flange retainer segment for engaging fastener means facilitating mounting the flanged head of the conduit;

at least one of said openings including a through bore and a semi-bore axially interconnected and formed at the juncture between the body portion and at least one of said legs; and

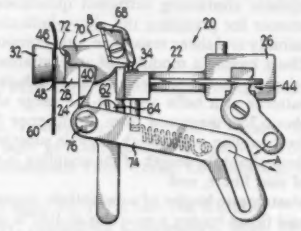
at least one of said first and second legs extending substantially beyond the body portion from one of the openings and terminating, at its tip, at a juncture with another of the openings.

4,023,837

TWINE CATCHER AND KNIFE TRAP ASSEMBLY FOR PACKAGE TYING MACHINE

Paul Pierce, Jr., La Grange, Ill., assignor to B. H. Bunn Company, Alsip, Ill.

Filed Sept. 3, 1976, Ser. No. 720,263
Int. Cl.² B65H *69/04*
U.S. Cl. 289—13 **5 Claims**



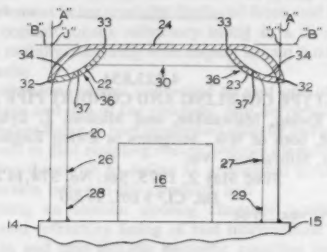
1. In a package tying machine capable of wrapping and knotting one or more reaches of tie material about a package, including a catcher mechanism for anchoring an initial end portion of the tie material during the wrapping and for receiving and anchoring also a second end portion of the tie material which is beyond the wrapped portion of the tie material, a knotter mechanism to one side of the catcher mechanism operating jointly on the reaches of twine which extend between the catcher mechanism and the wrapped portion to knot them together, and a knife trap assembly for releasing said initial end from the catcher mechanism and for severing said second-anchored of said reaches between the knot and catcher mechanism, leaving the second-anchored portion held by the catcher mechanism as the initial end portion for the succeeding cycle of the machine, the improvement comprising in combination: a stringholder button having a shaft, a bearing block having a configured face for cooperative juxtaposition with the button to frictionally retain the tie material therebetween, and means for urging the button toward the face of the bearing block, said bearing block including a slotted aperture formed therein for receiving said button shaft, whereby the cooperating abutment of said slotted aperture in said bearing block and said button shaft operate to prevent oscillation of said button in a direction toward said knotter mechanism while allowing oscillation of said button in a direction to effect maximal clamping of the tie material during the wrapping thereof.

4,023,838

WORK VEHICLE PROTECTIVE COVER

Charles J. Sabec, Chagrin Falls, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed June 17, 1976, Ser. No. 697,301
Int. Cl.² B62D *25/06*
U.S. Cl. 296—102 **6 Claims**



1. A protective cover for a work vehicle having front and rear ends, first and second sides, a width, and an operator's stations, comprising:

first and second frame members each of an inverted general U configuration having first and second legs, leg end portions, and a middle portion connecting the legs, said leg end portions of each frame member being connectable adjacent opposed sides of the vehicle and said frame members each being positionable adjacent opposed ends of the vehicle with the operator's station therebetween and the middle portions generally spanning the width of the vehicle;

first and second supporting members each having an arcuate cross sectional configuration, first and second end portions, first and second longitudinally extending edge portions, and a concave surface, said first and second end portions of each supporting member being connected to the first and second frame members generally at a juncture of the leg and middle portion of the frame member and oriented with said supporting members each having the concave surface directed outwardly, said first edge portions extending generally along the plane of the respective frame member legs and said second edge portions extending generally along the plane of the frame member middle portions; and

a roof member overlaying the first and second frame members and the operator's station and being in supporting contact with and connected to the first and second edge portions of the first and second supporting members.

4,023,839

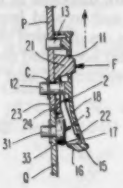
PUSH BUTTON LATCH

Robert H. Bisbing, Springfield, Pa., assignor to Southco, Inc., Lester, Pa.

Filed Jan. 29, 1976, Ser. No. 653,344
Int. Cl.² E05C *3/08*
U.S. Cl. 292—85 **8 Claims**

1. A push button latch comprising, in combination, a latch body and an actuator positioned within said body in operative engagement therewith, said body having front, side and end members, said front member being flexible in a direction substantially perpendicular to the plane of its outer face, an opening formed in said front member, inwardly facing keeper engagement means integral with said front member and spaced apart from said opening, a push button formed toward one end of said actuator and operatively positioned within said

opening, whereby inward depression of said push button causes outward motion of the opposite end of said actuator,



causing an outward motion of said front member of said latch body.

4,023,840

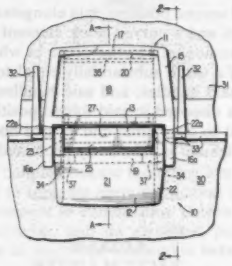
LATCH ASSEMBLY

Anthony J. Souza, Lancaster, and John M. Michel, Downingtown, both of Pa., assignors to Woodstream Corporation, Pa.

Filed May 13, 1976, Ser. No. 685,748

Int. Cl.² E05C *19/12*

U.S. Cl. 292—113 **2 Claims**



1. A latch assembly for releasably fastening a cover on a container having side walls, comprising:

a latch receiver having a lower component which is integrally molded to a side wall of said container and an upper component which is integrally molded to the cover adjacent said side wall, said lower component having a longitudinally extending arcuate slot which opens downardly, and said upper component including a planar member which angles upwardly away from the cover and having a notch at the outer edge of the top portion of said planar member;

b. a latch top segment having a planar base portion with a pair of side flanges and a top flange attached thereto and extending at right angles to said base; a longitudinal rib member attached to the top flange and extending downwardly at an angle away from the base, said rib releasably engaging the notch of said latch receiver when the latch assembly is in the closed position, the side flanges having extensions which project beyond said base portion at the end opposite to said top flange, a pin member located between said flange extensions and having one end thereof molded integrally with each of said flange extensions; and

c. a latch bottom segment having a planar base portion with a pair of side flanges attached thereto and extending at right angles to said base of the bottom segment, the side flanges having extensions which project beyond said base of the bottom segment at one end thereof, a pin member located between said flange extensions of the bottom segment and having one end thereof molded integrally with each of said flange extensions of the bottom segment, said pin member of the latch bottom segment being received within the arcuate slot of said latch receiver, an arcuate slot provided at the midportion of the inner edge of each side flange of the bottom segment, said arcuate slots of the side flanges receiving the pin member of said latch top segment;

each of said arcuate slots of said latch receiver and said latch bottom segment being shaped so as to encircle the respective pin to an extent sufficient to hold it in place while being discontinuous to an extent sufficient to allow the pin to be snapped in place within the slot, and the side flange extensions of the latch top segment projecting beyond the base of said top segment sufficiently to allow clearance for the latch bottom segment to pivot about its attachment to the pin member of said latch top segment.

4,023,841

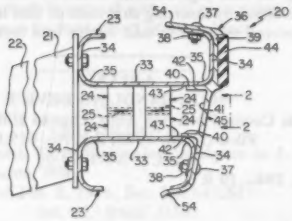
BUMPER CONSTRUCTION AND METHOD OF MAKING SAME

Lip F. Wong, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Aug. 15, 1975, Ser. No. 604,959

Int. Cl.² B60R *19/04*

U.S. Cl. 293—98 **6 Claims**



1. A bumper construction for a motor vehicle comprising, a pair of elongated metal members each having a plurality of integral U-shaped spacers extending therefrom toward an adjacent member, and means fixing associated U-shaped spacers together to hold said members in spaced relation, each U-shaped spacer being defined as an integral part of an associated member and having a bight arranged in spaced relation from the associated member and a pair of legs extending from opposite end edges of said bight in a diverging manner, each of said legs having a terminal outer end adjoining the associated member, each of said pair of members being an elongated roughly C-shaped member comprising a substantially planar main body terminating in curved portions at opposite side edges thereof and each U-shaped spacer extending from an associated planar main body and having its bight arranged substantially parallel to its main body, said planar main bodies of said pair of C-shaped members being disposed in parallel relation with their curved portions facing in opposite directions.

4,023,842

PORTABLE BAG SPREADER

Edwin B. Harvey, 1106 Timbergrove, Houston, Tex. 77008

Filed July 28, 1975, Ser. No. 599,418

Int. Cl.² A47F *13/08*; B65F *1/06*

U.S. Cl. 294—1 R **1 Claim**

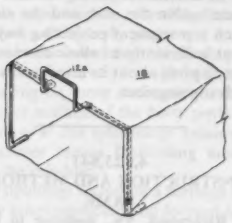
1. A spreader for holding open the mouth of a flexible bag, said spreader comprising:

a resilient frame having a central upper portion with a divergent downwardly extending leg at each and end thereof, said frame in its relaxed condition being too large to fit within the mouth of a bag, with which it is to be used, whereby, the divergent ends of the legs must be compressed toward each other to mount the bag upon the

frame, the resulting tension between the bag and the frame serving to retain the bag upon the frame,

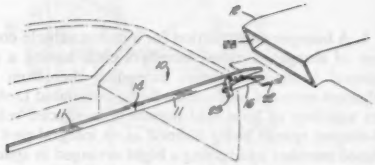
a handle in said central portion, adapted to extend outwardly from the mouth of a bag mounted upon said frame, and

a foot portion on the lower end of each of said legs for maintaining the spreader in an upright position,



said legs being formed of non-circular cross-sectional configuration, and said handle and feet being provided with leg receiving recesses of the same cross-sectional configuration as said legs, and appropriately sized to receive the ends of said legs therein, whereby said frame may be assembled by inserting said ends of said legs into said leg receiving recesses in said handle and feet.

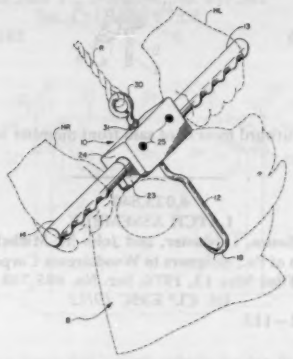
4,023,843
MAIL HANDLING DEVICE
C. Curtis Coons, 794A Via Altos, Laguna Hills, Calif. 92653
Filed Oct. 6, 1975, Ser. No. 619,835
Int. Cl.² A47F *13/06*
U.S. Cl. 294—19 R **8 Claims**



1. A hand-held mail handling tool for depositing mail in a curbside mailbox by a person seated in a vehicle stopped opposite the mail receiving opening of the mailbox, said tool comprising a long handle having a pair of spring biased pivotally connected jaw members at the forward end thereof for gripping and supporting flat mailing pieces in a horizontal plane generally coplanar with said handle as the user thrusts said tool and mailing pieces gripped therein forwardly lengthwise of said handle into the mail receiving opening of a mailbox, said jaw members including a release member which is pivotally mounted to one of said jaw members and engageable with stop means on the other jaw member to retain said jaw members in a mail-gripping closed position, said release member being engageable with a part of the mail box as the user of said hand-held tool thrusts said mail gripping jaw members forwardly through the mail receiving opening of a mailbox and operable by said engagement to release the mailing pieces for deposit by gravitation into the mailbox.

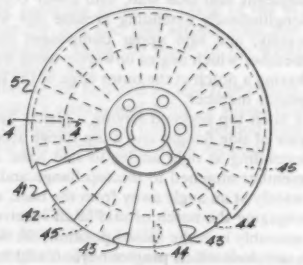
4,023,844
LARGE GAME CARRIER
Wendell E. Roberts, 3450 Dillon Acres, Zanesville, Ohio 43701
Filed Aug. 15, 1975, Ser. No. 605,196
Int. Cl.² B65G *7/12*
U.S. Cl. 294—26 **7 Claims**

1. A game carrier comprising a pivot block having a central longitudinal axis, an elongated hook secured to said pivot block and disposed in alignment with said longitudinal axis, and a pair of elongated handles pivotally mounted on said pivot block for swinging movement between a folded position where the handles are disposed in mutually parallel relationship to each other and to said hook and a second position wherein said handles are disposed in substantially perpendicular relationship to said hook, said pivot block including means limiting pivotal movement of said handles from said folded



position to said second position, said elongated hook including a shank portion and a curved hook element lying in a plane disposed perpendicularly to the plane in which said handles swing and is of a width substantially equal to the diametrical dimension of said handles; and said handles are of a length such that when disposed in said folded position, each handle extends at least to a terminal end of said hook whereby said curved hook element is effectively protected.

4,023,845
VACUUM LIFTER
Fred H. Schnebly, Lakewood, Calif., assignor to Northrop Corporation, Los Angeles, Calif.
Filed Sept. 5, 1975, Ser. No. 610,879
Int. Cl.² B66C *1/02*
U.S. Cl. 294—64 R **2 Claims**



1. An improved vacuum lifter comprising:

a. an exterior clamp overlying an interior clamp,

b. means defining a vacuum chamber on the underside of said interior clamp within a flat annular lip adapted to engage the surface of an object to be lifted,

c. a pair of segmented sealing rings clamped between said exterior and interior clamps, each of said rings being fabricated entirely of thin, high temperature resistent resilient material and radially slotted to define a ring of leaves, said rings being positioned relative to each other with the slots of one ring positioned over the approximate centers of the leaves of the other, said leaves extending

beyond and surrounding said vacuum chamber to form a seal,

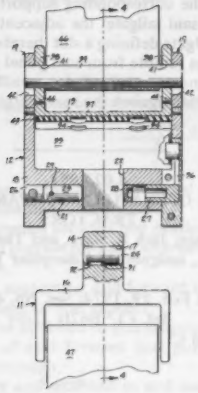
d. and means for applying suction to said vacuum chamber.

4,023,846

BROKEN-BOLT RELEASE MECHANISM

Paul W. Poehlmann, Stinson Beach, Calif., assignor to H. Koch & Sons, Inc., Anaheim, Calif.

Filed June 24, 1974, Ser. No. 482,354
Int. Cl.² A44B *19/00*; B64D *17/38*
U.S. Cl. 294—83 AE **16 Claims**



1. In a normal coupled release including a male and female member adapted to separate upon detonation of an explosive squib, the improvement in combination therewith comprising two sensing electrodes, and an electrical pulse generating means responsive to electrical conduction between said sensing electrodes,

means for conducting an electrical pulse from said pulse generating means to said explosive squib, for detonating said squib, and

means for insulating and isolating said sensing electrodes from the external environment preventing electrical current conduction therebetween and said means exposing said sensing electrodes to the external environment responsive to impulse tensile loading tending to separate said male and female members whereby electrical current conduction between said sensing electrodes is possible.

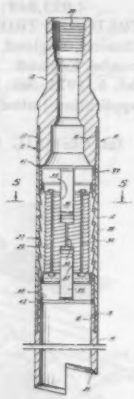
4,023,847

OVERSHOT TOOL

Derrel D. Webb, Houston, Tex., assignor to Houston Engineers, Inc., Tex.

Filed Aug. 20, 1975, Ser. No. 606,304
Int. Cl.² E21B *31/02*
U.S. Cl. 294—86.3 **7 Claims**

1. An overshot tool for use in recovering an object from a well bore, comprising a tubular body having an upper end adapted to be connected to the lower end of a pipe string so that the body may be raised and lowered within the well bore, a lower end adapted to move over the object as the body is so lowered, and downwardly and inwardly tapered surfaces on its inner diameter intermediate its upper and lower ends, a cylindrical grapple having downwardly and inwardly tapered surfaces on its outer diameter adapted to seat upon the tapered surfaces of the body, and spirally arranged teeth on its inner diameter, said grapple being split longitudinally and free to move upwardly within the body so as to permit it to expand outwardly for gripping an object of greater diameter than the teeth as the lower end of the body is moved over said object, each of the body and grapple having longitudinal slots extending from each end thereof, and means including tangs carried within the body and extending into the slots in the body and



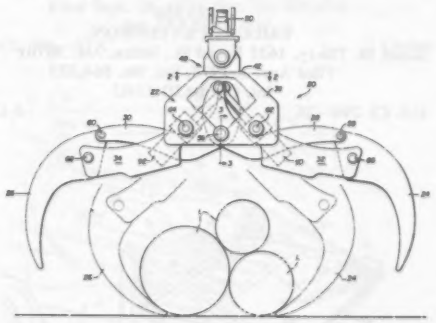
grapple so as to limit rotation of said grapple with respect to the body, as the body is rotated with said pipe string, in order that said teeth may be backed off of said object.

4,023,848

LOG GRAPPLE

Wilbur G. Bennett, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.

Filed Jan. 5, 1976, Ser. No. 641,857
Int. Cl.² B66C *3/16*
U.S. Cl. 294—88 **9 Claims**



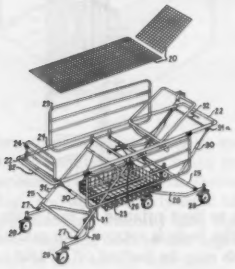
1. A grapple, particularly for logs, comprising a head for connection to a lift mechanism and a pair of opposed arcuate jaws, each of said jaws supported on said head by separate drive and driven links, said drive links each pivotally supported between its ends on a central pivot on said head, each of said driven links pivotally supported adjacent its upper end on said head on opposed sides of said central drive link pivots, the distal lower ends of each of said driven links being pivotally connected to the upper end of one of said jaws and the lower end of each of said drive links being pivotally connected to one of said upper jaw ends outboard of said driven link connections, and a drive means having two hydraulic cylinders, each hydraulic cylinder having a piston rod connected to the free upper ends of said drive links and a cylinder pivotally connected to one of the upper pivotal connections of said drive links, said drive means adapted to rotate said drive links about said central pivots to relatively close said jaws, said jaws

then crossing and raising to securely embrace logs confined therebetween.

4,023,849
STRETCHER TROLLEYS

Farkas Bethlen, Richmond, England, assignor to G. D. Searle & Co., High Wycombe, England

Filed Oct. 6, 1975, Ser. No. 619,800
Claims priority, application United Kingdom, Oct. 8, 1974, 43568/74
Int. Cl.² A61G 1/02
U.S. Cl. 296—20 **1 Claim**

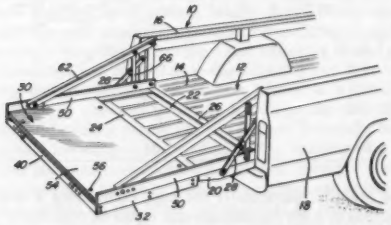


1. A stretcher trolley comprising a patient support member; a rectangular framework for receiving said support member; a pair of rectangular subframes each pivotably attached at one end to said framework at an off-center position at either side of the center-line of said framework; a pair of wheeled, triangular carriages each pivotably connected to the other end of each of said subframes; and two pair of fluid springs, each spring attached at ope end intermediate the ends of said subframes and at its other end to the ends of said framework.

4,023,850
TAILGATE EXTENSION

James M. Tillery, 1621 Broad St., Selma, Ala. 36701

Filed Apr. 2, 1975, Ser. No. 564,323
Int. Cl.² B62D 33/02
U.S. Cl. 296—26 **5 Claims**

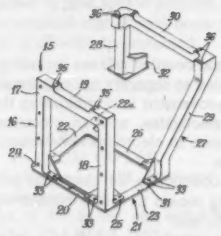


1. In combination with a vehicle load bed of the type including a floor having a rear marginal edge portion extending between corresponding rear ends of upstanding side walls of said load bed between which said floor extends and having a horizontal tailgate pivotally supported therefrom, extending along and projecting outwardly from said floor rear marginal edge portion substantially coextensive with said floor and including generally parallel pivoted inner and free swinging outer marginal edges with said inner marginal edge closely spaced from and generally paralleling said floor rear marginal edge portion, an elongated extension panel structure disposed outwardly of said tailgate outer free swinging marginal edge substantially coextensive with said tailgate, said panel structure including opposite inner and outer marginal edges and opposite longitudinal side edges, said inner marginal edge of said panel extending along and including portions thereof abutted against said outer free swinging marginal edge of said tailgate, a pair of longitudinal support arms supported from said extension panel structure and extending laterally outwardly from opposite ends of said inner marginal edge of said panel structure and fully across said tailgate between the free swinging and pivoted marginal edges thereof and overlying said tailgate in contact therewith, inclined bracing arms anchored at their lower ends to rear ends of said side edges of said panel structure and releasably secured at their upper ends to upper portions of the rear ends of said side walls spaced above said floor, and an upstanding rigid brace extending and connected between the upper end of each bracing arm and that portion of the corresponding support arm overlying the pivoted edge of said tailgate, the adjacent marginal edges of said floor and tailgate defining a slot therebetween, the ends of said support arms remote from said panel structure including depending abutments received downwadly in said slot and horizontally abutted against the rear marginal edge portion of said floor.

4,023,851
MODULAR OPERATOR'S COMPARTMENT FOR TRACTORS

Richard D. Palmer; Jack R. Barr, and Thomas E. Hrodey, all of Decatur, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 19, 1974, Ser. No. 443,510
Int. Cl.² B62D 27/04
U.S. Cl. 296—28 C **5 Claims**



1. A modular operator's compartment for a vehicle comprising

an open-sided and unitized frame structure having an upstanding and generally rectangular forward section, a horizontally disposed and generally rectangular bottom section secured at its forward end to a lower end of said forward section and an upstanding rearward section secured at its lower end to a rearward end of said bottom section,

plurality of cover panels mounted on said frame structure to substantially cover the same,

an operator's seat mounted on said bottom section, adjacent said rearward section, to face said forward section,

a dash panel mounted interiorly on said forward section,

first securance means on said bottom section for removably securing said frame structure to a frame of a vehicle, and

second securance means on each of said forward and rearward sections for removably securing a covering structure over said operator's compartment, said compartment being releasably attached on a frame of a vehicle by releasable fastening means engaging said first securance means, said cover panels including a cover panel removably attached to the exterior of said forward section by means of removable fastening means for providing access behind said dash panel,

said rearward section comprising a first upstanding member secured at its lower end to a corner of said bottom section, a cross-member having its first end secured on an

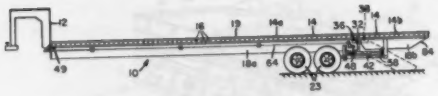
upper end of said first upstanding member and a second upstanding member having its upper end secured to a second end of said cross-member, the lower end of said second upstanding member being shorter than said first upstanding member and terminating short of said bottom section in unattached relationship therewith.

4,023,852

TILTABLE VEHICLE LOADING RAMP

Gary E. Clark, Rte. 2, Box 262 A, Shelbyville, Ky. 40065

Filed Apr. 2, 1976, Ser. No. 673,146
Int. Cl.² B60P *1/26*
U.S. Cl. 296—61 **9 Claims**



1. A loading ramp assembly for a flat bed vehicle such as a truck, trailer, and the like, comprising
a stationary horizontal forward bed portion,
a tiltable rear bed portion pivotally attached to said horizontal bed portion,
frame means for supporting said forward and rear bed portions independent of one another,
a first support arm attached to and suspended beneath said frame means of said forward bed portion defining an opening therethrough,
a second support arm attached to and suspended beneath said frame means of said rear bed portion, and
an elongated restraining arm pivotally connected on one end to said second support arm and slidably disposed through said opening in said first support arm, said restraining arm defining a slot therein adapted to lock said restraining arm in a fixed position in said first support arm when said rear bed portion is in a horizontal load carrying position, said restraining arm being slidable forward through said opening when said slot is disengaged from the opening defining portion of said first support arm and when said rear bed portion is tilted downward from said horizontal load carrying position toward an inclined loading position.

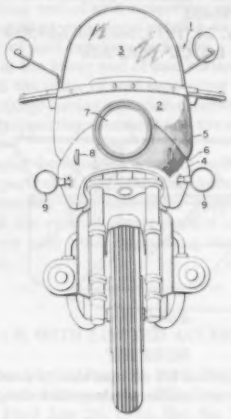
4,023,853

MOTORCYCLE FAIRING

Yoichi Oguma, Asaka, and Minoru Morioka, Niiza, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1975, Ser. No. 643,941
Claims priority, application Japan, Aug. 6, 1975, 50-108851
Int. Cl.² B62J *17/04*
U.S. Cl. 296—78.1 **6 Claims**

1. A motorcycle fairing comprising a lower windshield section mounted on the front portion of the body of a motorcycle and extending outwardly and rearwardly to cover the upper forward portion thereof, and a transparent upper windshield section mounted upright on said lower windshield section to cover the forward portion of an operator, said lower windshield section including a pair of lower side surface portions integrally connected to one another at the front portions thereof to form a streamlined-shaped configuration in horizontal section, and a pair of upper side surface portions also integrally connected to one another to form a streamlined configuration in horizontal section, said upper side surface portions each having a vertical height which diminishes gradually in rearward direction, said upper and lower side surface portions being integrally joined together to define a pair of inwardly concave grooves at opposite sides of the fairing, said



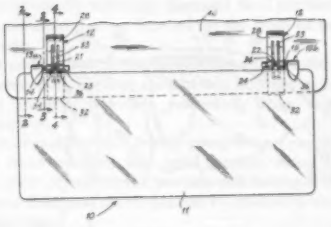
grooves gradually sloping rearwardly downwards along the length of said lower windshield section.

4,023,854

VISOR

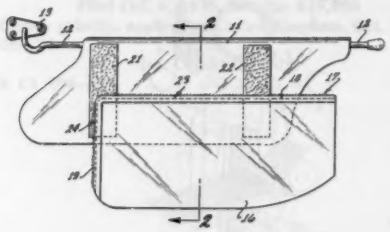
Frank Nack, Jr., 4314 Carson Road, St. Louis, Mo. 63121

Filed Sept. 24, 1975, Ser. No. 616,494
Int. Cl.² B60J *3/00*
U.S. Cl. 296—97 C **7 Claims**



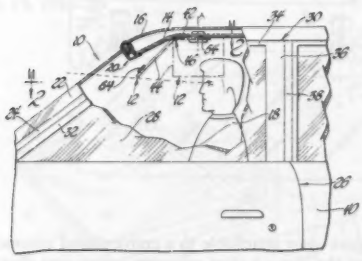
1. In a glare visor attachable to a conventional automobile sun visor or the like : a glare-reducing transparent sheet, at least one connecting device, and at least one clamp for attaching the sheet to the visor; the connecting device having a first portion secured to the sheet and extending beyond the edge thereof, and having a swivel part projecting laterally from the part of the first portion that extends beyond the edge of the sheet, with a rounded portion forming a swivel portion, the clamp being of generally U-shaped springy material with two legs that can yieldingly engage opposite sides of a sun visor to hold the clamp thereon, a first tongue formed integrally with and projecting from one leg toward the other to apply force against the visor between the legs, a bearing formed in the other leg to pivotally receive the rounded portion of the connecting member, and a second tongue formed integrally with and projecting from the said other leg to engage the rounded portion and urge it into engagement with the bearing.

4,023,855
GLARE SHIELD
Shirleen J. Janata, and Thomas A. Janata, both of 835 Ayers Lane, Galt, Calif. 95632
Filed Nov. 24, 1975, Ser. No. 634,930
Int. Cl.² B60J 3/00
U.S. Cl. 296—97 C 4 Claims



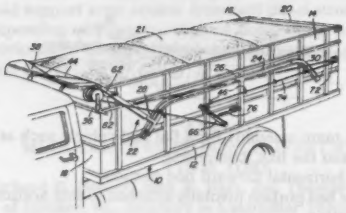
1. A glare shield device for an operator of a motor vehicle having a windshield and a side window, said device comprising:
a sun visor mountable behind the windshield of said motor vehicle and having upper and lower edges and opposite side edges;
a glare shield having an upper and lower edge and opposite side edges;
a first type of pressure sensitive readily releasable engaging means strip affixed to one side of said visor;
a second type of pressure sensitive readily releasable engaging means strip affixed to said shield;
said second type strip being affixed in a wrap-around folded relationship over one of said edges of said shield.

4,023,856
VEHICLE SUN SHIELD
Delbert Duane DeRees, Utica, Mich., assignor to American Motors Corporation, Detroit, Mich.
Filed Apr. 2, 1976, Ser. No. 672,942
Int. Cl.² B60J 3/02
U.S. Cl. 296—97 R 8 Claims



1. A vehicle sun shield comprising: a planar support of a generally triangular shape; means for mounting the triangular support adjacent one vertex thereof for movement about a vertical axis on the lower side of a vehicle roof above a front seat occupant in a parallel relationship to the roof; said triangular support including a hinge edge opposite said one vertex thereof and a pair of side edges extending from said hinge edge to said one vertex; said side edges of the triangular support being located in an oblique relationship to the hinge edge thereof and meeting with the hinge edge thereof to define the other two vertices of the support; a planar sun visor of opaque material; said sun visor including a hinge edge of the same length as the hinge edge of the support and a pair of side edges extending away from the hinge edge thereof; and a friction hinge pivotally interconnecting the hinge edges of the support and the sun visor with the side edges thereof meeting at a pair of spaced junctions coincident with said other two vertices of the support, said sun visor being supported by the hinge and the mounting means for movement about a horizontal axis and for angular movement in a manner that shields a front seat occupant from the sun in any frontal or side direction.

4,023,857
TENSIONED AND RETRACTABLE TRUCK BODY TARPAULIN
Donald C. Killion, Great Falls, Mont., assignor to Rose Killion, Great Falls, Mont., a part interest
Filed Apr. 24, 1975, Ser. No. 571,081
Int. Cl.² B60J 11/00
U.S. Cl. 296—98 9 Claims



1. In combination, an elongated vehicle load bed including opposite side upstanding longitudinal side walls having upper marginal edges, a pair of upstanding support arms for a flexible cover, elongated rigid track guide means stationarily supported from and extending longitudinally of said side walls, the lower ends of said support arms including follower means guidingly engaged with said track guide means for movement therealong, said follower means being operative to support said arms at each of the opposite ends of said load bed with said arms upwardly and outwardly inclined relative to the corresponding end of the associated load bed and to (1) upwardly elevate said support arms along upwardly inclined paths upon initial movement of said support arms away from one end of said load bed toward the other end of said load bed, (2) swing said arms to generally upright positions and guide said arms horizontally, in upright positions, toward said other end of said load bed upon further movement of said arms toward said other load bed end and (3) thereafter further swing said arms to positions upwardly and outwardly inclined relative to said other load bed end and lower said arms along downwardly inclined paths upon final movement toward said other load bed end, the upper end portions of said arms being spaced above the adjacent upper marginal edges of said side walls throughout a major portion of the movement of said support arms along said guide means, said upper end portions of said arms including means adapted to be attached to opposite side portions of one end of the flexible cover to be lengthwise extended over said load bed from one end thereof, said guide means being spaced below the upper marginal edges of said side walls.

4,023,858
CRANK AND DRIVE MECHANISM FOR A RAISABLE SLIDING TOP OF A MOTOR VEHICLE
Horst Bienert, Gauting, and Walter Schatzler, Starnberg, both of Germany, assignors to Webasto-Werk W. Baier KG, Stockdorf near Munich, Germany
Filed Oct. 1, 1975, Ser. No. 618,349
Claims priority, application Germany, Oct. 3, 1974, 2447196
Int. Cl.² B60J 7/02
U.S. Cl. 296—137 G 11 Claims

1. In a vehicle roof comprising an opening,
a panel within said opening with a plurality of positions

a crank and a drive mechanism for moving said panel from a closed position alternately into a retracted or in a raised position and back into the closed position

said mechanism including:

a crank arm with a crank shaft;

said crank arm fixed to said crank shaft;

said crank shaft non-rotatably carrying:

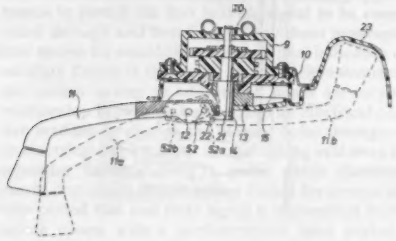
a first gear wheel,

a driving pinion with a shaft for moving said panel and fixed to said pinion shaft,

said pinion shaft further carrying

a second gear wheel non-rotatably secured thereto,

said first and second gear wheels forming a first transmission path between said crank shaft and pinion shaft,



said vehicle roof further comprising:

a crank arm holding recess, and

said mechanism including means to retract the said crank arm into said holding recess in a plurality of positions of the panel,

the improvement forming a second transmission path between said crank shaft and said pinion shaft with a reduction transmission ratio greater than that of the first transmission and

means for engaging said second transmission path in lieu of the first transmission path in the closed position of said panel for moving said panel into a raised position.

4,023,859

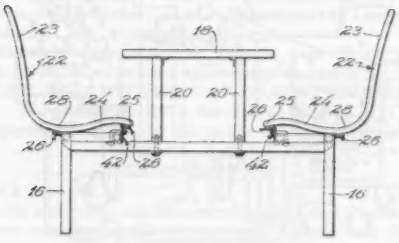
SEAT ANCHOR

Leo J. Hagenson, Kenyon, Minn., assignor to Foldcraft Company, Kenyon, Minn.

Filed Jan. 22, 1976, Ser. No. 651,502

Int. Cl.² A47B *83/04*

U.S. Cl. 297—158 **10 Claims**



1. A means of supporting a seat to a frame, said frame having parallel supporting members including:

clips secured to the undersurface of said seat having portions thereof spaced from the undersurface of said seat,

brackets having vertical center portions and upper flanges engaged between said seat and said spaced portions of said clips,

one of said brackets including a lower supporting flange underlying one of said supporting members and holding said seat from movement relative to said frame,

the other of said brackets including a generally horizontal flange at the lower end of said vertical portion extending beneath the other of said supporting members, said horizontal flange having a portion extending beyond the other of said supporting members and toward said one bracket, and

an L-shaped bolt having one leg extending through said flange portion of said other bracket and having the other leg extending over said other supporting member and through the vertical center portion of said other bracket to secure said other supporting member to said other bracket.

4,023,860

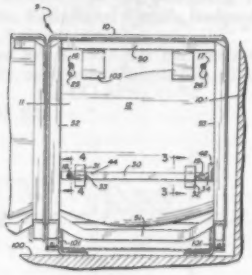
SEAT BACK WITH LIMITED ACCESS TO THE REAR THEREOF

Arthur J. Harder, Jr., Franklin Park, Ill., assignor to Coach & Car Equipment Corporation, Elk Grove Village, Ill.

Filed July 26, 1976, Ser. No. 708,482

Int. Cl.² A47C *27/00*

U.S. Cl. 297—283 **11 Claims**



1. A seat back comprising:

a substantially vertically disposed shell portion;

a removable portion located on the front of said shell portion;

first and second horizontally spaced fastener means on said removable portion, each of said fastener means extending in an axial direction rearwardly from said removable portion;

each of said fastener means comprising a shank portion and a head portion, said head portion being located rearwardly of said shank portion and having a larger dimension than said shank portion transverse to the axis of said fastener;

said shell portion having a pair of horizontally spaced openings each comprising means for receiving a respective one of said first and second fastener means therethrough;

a horizontally disposed locking member located on the back of said shell portion;

means mounting said locking member for sliding movement in a horizontal direction between first, second and third positions thereof;

first and second slot means on said locking member;

means on said first slot means for receiving therethrough the head portion of said first fastener means when said locking member is in said first position;

means on said first slot means for embracing the shank portion of said first fastener means and for holding said first fastener means against forward axial movement, when the locking member is in its second and third positions;

means on said second slot means for receiving therethrough

the head portion of said second fastener means when said locking member is in its first and second positions;

and means on said second slot means for embracing the shank portion of said second fastener means and for holding said second fastener means against forward axial movement, when the locking member is in its third position.

4,023,861

METHOD AND APPARATUS FOR CONTROLLING A TUNNELING MACHINE

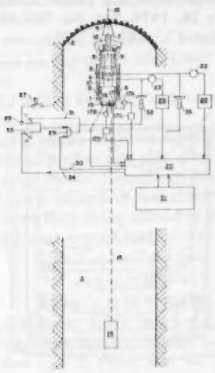
Günter Schnell, Bochum, Germany, assignor to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H., Bochum, Germany

Filed Nov. 21, 1975, Ser. No. 634,163

Claims priority, application Germany, Dec. 11, 1974, 2458514

Int. Cl.² E21D *9/10*

U.S. Cl. 299—1 **8 Claims**



1. A control system for controlling displacement of a winning tool by a support arm adapted for universal movement while supported by the frame of a tunneling machine employed to form a tunnel with a desired profile, said control system including the combination of:

means for projecting a laser beam in a direction along a desired tunnel heading toward said tunneling machine while the winning tool thereof is arranged to release material from the heading face of a tunnel,

means including a laser beam detector on the tunneling machine for generating first electrical signals corresponding to a position change of said tunneling machine with respect to said laser beam,

means for generating second and third electrical signals corresponding to perpendicular position coordinates of said winning tool with respect to said tunneling machine,

means responsive to said first and second electrical signals to continuously compute a limit coordinate signal which corresponds to a measure of the distance lying perpendicularly between an intersection with the winning tool as defined by an intersection with one of said two perpendicular position coordinates and a point on the track of movement by the winning tool when cutting the heading face at a tangent to the desired profile of the tunnel, said last-named means being responsive to said third electrical signal by comparing therewith said limit coordinate signal in a manner to prevent movement of the winning tool beyond the desired profile of the tunnel as defined by said limit coordinate signal, and

control means responsive to said limit coordinate signal for universal positioning of said winning tool to form a desired tunnel profile.

4,023,862

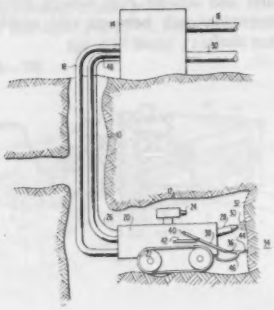
HYDRAULIC MINING AND TRANSPORTATION OF COAL USING HOT OIL UNDER PRESSURE

Louis Gold, 2725 39th St., NW., Washington, D.C. 20007

Filed Dec. 24, 1975, Ser. No. 644,007

Int. Cl.² E21C *41/00*

U.S. Cl. 299—14 **1 Claim**



1. A method of mining and transporting coal comprising heating and pumping a supply of oil under pressure to a body of unmined coal, directing a jet of said oil under pressure against said body of coal to disintegrate said coal and form a slurry of coal and oil, screening said slurry of coal and oil to remove the larger pieces of coal, recycling the slurry of coal fines and oil through the foregoing steps until said slurry reaches the desired consistency and pumping said slurry of desired consistency to a desired destination via pipeline.

4,023,863

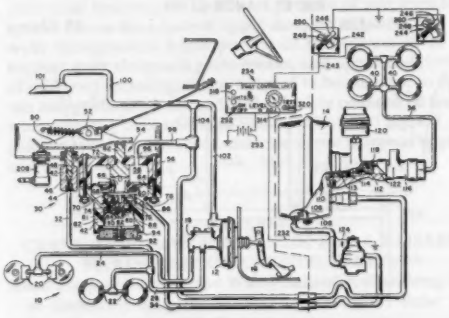
SWAY CONTROL SYSTEM FOR A TOW VEHICLE-TRAILER COMBINATION

Albert E. Sisson, and Robert A. Essad, both of Southfield, Mich., assignors to The Bendix Corporation, South Bend, Ind.

Filed Nov. 24, 1975, Ser. No. 634,692

Int. Cl.² B60T *13/08*

U.S. Cl. 303—7 **9 Claims**



1. In a tow vehicle-trailer braking system having a first brake applying servomotor responsive to an operator input for establishing a first braking signal which activates the wheel brakes in the tow vehicle and a second brake applying servomotor responsive to said first braking signal for establishing a second braking signal which activates the wheel brakes in the trailer, sway control means for supplying said second brake

applying servomotor with an independent actuation signal to momentarily activate the wheel brakes in the trailer, said sway control means comprising:

a housing having a chamber therein with an entrance port, an exit port and an atmospheric port, said entrance port being adapted to receive said first braking signal which operates said first brake applying servomotor, said exit port being connected to said second brake applying servomotor;

distribution valve means located in said chamber for establishing a first flow path between said entrance port and said exit port;

poppet valve means located in said chamber for establishing a second flow path between said atmospheric port and said exit port;

first resilient means connected to said housing for holding said distribution valve means away from said poppet valve means to permit the first braking signal to be communicated through said first flow path without interruption;

sensor means for establishing a sway signal indicative of any oscillary forces in the trailer switch means connected to said sensor having an adjustment means for varying the relationship between a contact and an electrical conductive medium to change the closure point through which an electrical current flows in establishing said sway signal;

comparator means having a pulse width discriminator means connected to said sensor means for comparing the time period that said sway signal is transmitted from said switch means with a predetermined time period, said pulse width discriminator means inhibiting the transmission of a sway control signal when said sway signal is less than said predetermined time period, said pulse width discriminator means allowing a sway control signal to be produced when said sway signal is longer than said predetermined time period;

delay means for maintaining said sway control signal up to 1.5 seconds after said sway signal has terminated; solenoid means responsive to said sway control signal for moving said distribution valve means to interrupt communication through said first flow path by overcoming said first resilient means to actuate said poppet valve means and allow air to flow through the second flow path from said atmospheric port to establish said independent actuation signal for said second brake applying servomotor; and

second resilient means connected to said housing for modifying the output of said solenoid means to limit the rate of movement of said distribution valve as a direct function of said sway control signal.

4,023,864

AUTOMATIC STABILITY CONTROL SYSTEM WITH STRAIN GAUGE SENSORS

Thomas J. Lang, Torrance, Calif.; Joseph A. Lang, Huntington Station; Kenneth G. Lang, East Northport and Robert L. Davis, Lloyd Harbor, all of N.Y., assignors to Lang Davis Industries, Inc., Huntington, N.Y.

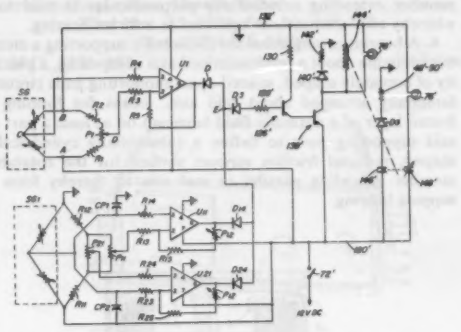
Continuation-in-part of Ser. No. 399,196, Sept. 20, 1973, Pat. No. 3,908,782, which is a continuation-in-part of Ser. No. 269,035, July 5, 1972, Pat. No. 3,895,683. This application Sept. 29, 1975, Ser. No. 617,714

The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.

Int. Cl.² B60T *7/20*

U.S. Cl. 303—20 **21 Claims**

1. An automatic stability control system for a vehicle to prevent swerving and swaying of said vehicle, said system comprising: means for sensing lateral acceleration forces acting upon said vehicle to provide low level electrical acceleration signals proportional to the magnitude of said forces, means for amplifying said low level acceleration signals to provide large amplitude brake control signals proportional to the magnitude of the forces, and brake means associated with said vehicle including right and left brakes and responsive to said brake control signals to simultaneously actuate said right and left brakes in an equal gradual and continuous mode to prevent swaying and swerving of said vehicle, said sensing



means including a force responsive mass oriented to sense lateral acceleration and provide by strain gauge sensor means instantaneous response upon sensing lateral acceleration.

4,023,865

STAPLE CLEAT FOR SNOWMOBILE TRACK

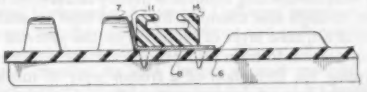
Roger Morissette, Repentigny, Canada, assignor to Bombardier Limited, Valcourt, Canada

Filed July 8, 1975, Ser. No. 593,970

Claims priority, application Canada, Feb. 14, 1975, 220134

Int. Cl.² B62D *55/24*

U.S. Cl. 305—35 EB **9 Claims**



1. An endless snowmobile track of the internal drive type having at least one longitudinal row of drive lugs extending inwardly from the inside surface of the track, said lugs being positioned to be driven by a powered drive sprocket, said track further including an external ground engaging surface, a plurality of metallic staple cleats mounted on said track in at least one longitudinal row, said longitudinal row of cleats being spaced laterally from any longitudinal row of said drive lugs and positioned to slidingly contact a slide element of the suspension system of the snowmobile, each cleat having a bearing surface part positioned against the inner surface of the track and at least two integral teeth located on opposite sides of said bearing surface part extending substantially perpendicular thereto, said bearing surface part of each said staple cleat being elongate and upwardly convexly curved in the longitudinal direction of said track, and said teeth piercingly penetrating through the material of the track and the ends of said teeth grippingly engaging the material of said snowmobile track.

4,023,866

ICE BEARING

Francisco Jose Gutierrez Atencio, Estancia "Santa Maria", Estafeta Dr. Garcia, Diamante, Entre Rios, Argentina

Filed Feb. 22, 1974, Ser. No. 444,766

Claims priority, application Argentina, Mar. 7, 1973, 246921

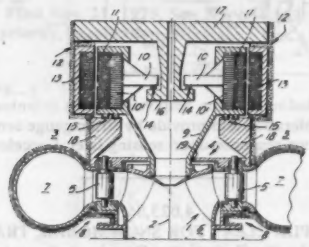
Int. Cl.² F16C *1/24, 17/02, 17/08, 37/00*

U.S. Cl. 308—77 **12 Claims**

1. A bearing arrangement for frictionally supporting a member rotatable about a predetermined axis comprising, a plurality of thrust pads circumferentially arranged about said prede-

termined axis, means for forming a frozen layer of a normally fluid lubricant on at least a part of said thrust pads to define a reduced friction support surface for the supported rotatable member extending substantially perpendicular to said axis whereby said arrangement operates as a thrust bearing.

6. A bearing arrangement for frictionally supporting a member rotatable about a predetermined axis comprising, a plurality of arcuately shaped, spaced-apart supporting pads circumferentially arranged about said axis, means for forming a frozen layer of a normally fluid lubricant on at least a part of said supporting pads to define a substantially cylindrically shaped, reduced friction support surface for the rotatable member extending parallel to said axis to thereby form a support bearing.



11. A pad for bearing arrangement comprising a relatively small, hollow body having a continuous side wall and an interior defining a chamber, said body having a bearing surface disposed above the top of said chamber, an inlet and an outlet communicating the interior of said chamber with the exterior of said body, said hollow body having a wall portion composed of heat conducting material whereby circulation of a refrigerant through said chamber from said inlet to said outlet produces a frozen layer of lubricant on the external face of said wall portion to form said bearing surface and means for preventing the formation of a frozen layer of lubricant on the external face of another wall portion of said hollow body.

4,023,867

ROLLER BEARING FOR BACKUP ROLLERS IN MULTI-ROLL MILLS

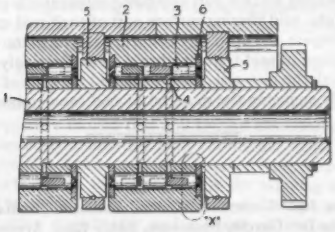
Rudolf Piller, Schweinfurt, Germany, assignor to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed Jan. 19, 1976, Ser. No. 650,288

Claims priority, application Germany, Jan. 31, 1975, 2503916

Int. Cl.² F16C *35/06*

U.S. Cl. 308—207 R **5 Claims**



1. In a roller bearing assembly for supporting rollers of multiple roll mills wherein the respective supporting rollers have an inner bearing race, roller bodies and an outer bearing race serving at the same time as the supporting roller, the improvement comprising loose boundary rings and bayonet lock means for releasably mounting and connecting said rings to respective opposite lateral ends of the outer bearing race, wherein the roller bodies are confined in operative relation between the inner and outer races.

4,023,868

BEARING DEVICE

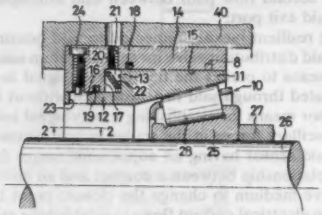
Toshio Miki, Yao, Japan, assignor to Koyo Seiko Company, Limited, Osaka, Japan

Filed Apr. 29, 1976, Ser. No. 681,770

Claims priority, application Japan, May 13, 1975, 50-57593

Int. Cl.² F16C *9/00*

U.S. Cl. 308—207 A **4 Claims**



1. A device including a preload-adjustable roller bearing adapted to carry a radial load and a thrust load at the same time, the device comprising:

an outer ring constituting the bearing and integrally formed with a cylindrical portion extending from its small diameter end at the radially inward portion thereof,

a case having an inside surface including a large diameter cylindrical surface and a small diameter cylindrical surface to provide a stepped portion in the inside surface, the case receiving the outer ring fitted therein with its large diameter cylindrical surface in sliding contact with the outside surface of the outer ring, the small diameter cylindrical surface being fittingly in sliding contact with the outside surface of the cylindrical portion, the large diameter and small diameter sliding contact surfaces guiding sliding movement of the outer ring,

guide means for rendering the outer ring slidable only axially within the case,

means for sealing the large diameter and small diameter sliding contact surfaces of the case and of the outer ring, and

a pressure chamber defined by and provided between stepped portion end surfaces axially facing each other and formed between the large diameter and small diameter sliding contact surfaces of the case and of the outer ring to receive a pressure fluid fed from a fluid inlet of the case, the pressure chamber causing the pressure of the fluid to act directly on the small diameter end face of the outer ring and to thereby press the outer ring in a preloading direction.

4,023,869

CROSSED AXIS TAPERED ROLLER BEARING ASSEMBLY

Samuel I. Caldwell, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 15, 1975, Ser. No. 577,809

Int. Cl.² F16C *33/00*

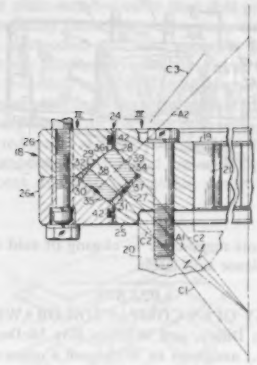
U.S. Cl. 308—214 **8 Claims**

1. A heavy duty tapered roller swing bearing assembly comprising, in combination:

a raceway including first and second races which have four faces that define an annular cavity the cross-section of which is a quadrilateral with converging opposite faces, one of said races being rotatable relative to the other;

and tapered bearing rollers rotatably supported in said cavity with the axes of rotation of alternate rollers at substantially 90° to one another, each of said rollers

having a tapered circumferential surface confined between two of the converging opposite faces of the cavity and having an end surface abutting a third face, and said



rollers having shallow arcuate circumferential grooves generally midway between their ends which slidably interfit with one another, whereby each roller is guided by the rollers which flank it.

4,023,870

SELF-CENTERING DEVICE TO FASTEN A ROTATORY WHEEL AGAINST AXIAL MOVEMENTS

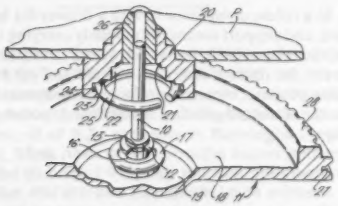
Domenico Tuninetti, Rome, Italy, assignor to SPEM: Societa Prodotti Elettronici Meccanici, Rome, Italy

Filed Jan. 8, 1976, Ser. No. 647,597

Claims priority, application Italy, Jan. 15, 1975, 47699/75

Int. Cl.² F16C *17/00*

U.S. Cl. 308—237 R **4 Claims**



1. A device for centering and fastening a rotating body against axial movements on a stationary mounting member comprising: a cylindrical sleeve rigidly connected to said rotating body and concentric thereto; an annular member, having a central opening and a torus-shaped periphery, adapted to be loosely fitted on said sleeve and held thereon by retaining means; a bush rigidly mounted on said stationary mounting member and having an inner cylindrical surface, the end portion of said inner cylindrical surface being of such diameter and axial extension to freely receive said cylindrical sleeve and said annular member thereon, and resilient retaining means mounted on said bush and protruding from said inner cylindrical surface of said end portion, said resilient retaining means having a diameter less than said torus-shaped periphery, capable of resiliently yielding to allow said torus-shaped periphery to pass when the latter is forced against said resilient retaining means by an axially directed force, and snapping again into its protruding position after said periphery is passed.

4,023,871

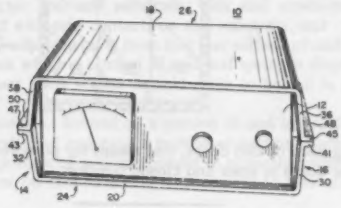
CABINET

Danny M. Dantzler, Lincoln, Nebr., assignor to Hy-Gain Electronics Corporation, Lincoln, Nebr.

Filed Mar. 15, 1976, Ser. No. 667,123

Int. Cl.² A47B *87/00*

U.S. Cl. 312—107 **9 Claims**



1. A cabinet for electronic equipment comprising;

a front panel and a rear panel;

a U-shaped member having a central section and two side sections, said side sections extending at an angle to said central section;

each of said side sections of said U-shaped member having a different outwardly-extending flange at its distal end;

an inverted U-shaped member having a central section and two side sections extending at an angle to the central section;

each of said side sections of said inverted U-shaped member having a different outwardly-extending flange at its distal end;

fastener means along said U-shaped and inverted U-shaped members for receiving said front and rear panels;

said outstanding flanges being shaped to abut each other when said U-shaped and inverted U-shaped members are positioned together around said front and rear panels;

channel means for holding said end flanges of said first U-shaped member to said flanges of said inverted U-shaped member, whereby a cabinet is formed for holding electrical equipment within it;

said fastener means including parallel wall members forming slotted ridges;

said parallel wall members being spaced from each other a distance substantially equal to the thickness of said panels;

said side sections forming an obtuse angle with said center sections of said U-shaped and inverted U-shaped members;

said slotted ridges being larger at the top of said end members than at the bottom.

4,023,872

CABINET

James J. Palka, Arlington Heights, and Michael V. Rutkovsky, West Chicago, both of Ill., assignors to General Bathroom Products Corporation, Grove Village, Ill.

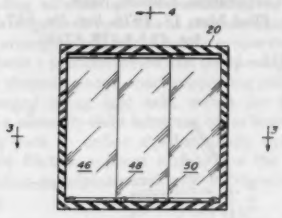
Filed Apr. 15, 1976, Ser. No. 677,330

Int. Cl.² E05D *11/06*

U.S. Cl. 312—226 **5 Claims**

1. A lightweight cabinet for bathrooms comprising a one piece, molded cabinet body having an ornamental frame surrounding the face of said body and having top, bottom, side and rear walls with integrally formed spaced shelving provided interiorly in the body, a plurality of removable mirrored doors

pivotally secured in the margins of said body each capable of opening independently of the others, means for opening and



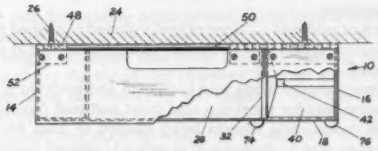
closing each of said doors, and means for positively positioning the doors in open and closed position.

4,023,873

COMBINATION ARM REST

Aldro J. Barker, 2282 Fruitland Drive, North Ogden, Utah 84404

Filed Oct. 30, 1975, Ser. No. 627,056
Int. Cl.² B60R *7/00;* **A47B** *81/00*
U.S. Cl. 312—235 A **1 Claim**



1. In combination an arm rest attached to a vehicle door comprising a horizontally extending member with a top, a bottom, opposite vertical end walls and opposite vertical side walls forming a substantially rectangular compartment, a vertical partition adjacent one end of the compartment extending from said top to bottom, one of said vertical walls having cut-outs, a removal ash tray in said compartment between said vertical partition and adjacent end wall, said ash tray having horizontal lips disposed on said cut-out and extending over said side wall opposite it with a hole in the bottom to drop cigarettes therethrough, a removable cup-shaped member with horizontal lips extending over another cut-out and over said side wall opposite it, providing a cash compartment, the space between said cup shaped member and said ash tray forming a trash compartment, coiled spring means disposed in said bottom biasing it in a closed position, said top comprising separate hinged members for access to said individual compartments.

4,023,874

OXYGEN MASK STOWAGE

Howard W. Jong, Monterey Park, and Maurice F. McDonell, Long Beach, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

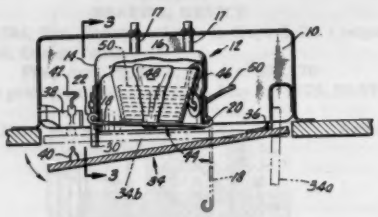
Filed Feb. 23, 1976, Ser. No. 660,660
Int. Cl.² B64C *1/14;* **B60N** *1/00*
U.S. Cl. 312—291 **4 Claims**

1. An oxygen system restraining device for use in an oxygen storage equipment compartment with a rotating door comprising:

a cannister attached to said compartment, said cannister open at the bottom;

releasable bridging means to span the open bottom of said cannister;

a latch to hold said bridging means in position spanning the open bottom of said cannister;



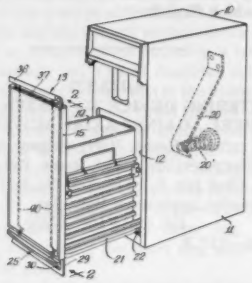
actuator means responsive to closing of said compartment door to release said latch.

4,023,875

EASY OPEN COMPACTOR DRAWER

Charles Rogers Difley, and William Roy McDonald, both of Danville, Ky., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed July 24, 1975, Ser. No. 599,010
Int. Cl.² B30B *15/00;* **A47B** *51/00*
U.S. Cl. 312—319 **16 Claims**



1. In a refuse compactor having a drawer for holding refuse, a base, and support means for movably carrying the drawer for selective disposition in a retracted, compacting position wherein the drawer rests on the base and an exposed refuse loading position, means for effecting movement of the drawer from the retracted position toward the exposed position comprising:

reaction means adjacent said drawer; and

an operating member movably carried by said drawer for selective engagement with said reaction means when said drawer is in said retracted position to draw said drawer upwardly from the base and concurrently urge said drawer away from said retracted position on said support means toward said exposed position, said operating member moving with said drawer selectively away from and toward said reaction means.

4,023,876

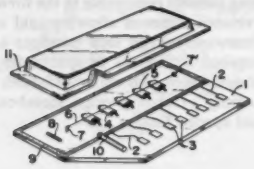
METHOD OF MAKING A FLUORESCENT DISPLAY DEVICE HAVING SEGMENTARY ANODES

Ichiro Fukunaga; Akira Kani, both of Nagoya, and Shuji Sakanishi, Odawara, all of Japan, assignors to Nippon Toki Kabushiki Kaisha, Nagoya, Japan

Filed May 19, 1975, Ser. No. 578,967
Claims priority, application Japan, May 23, 1974, 49-57349
Int. Cl.² H01J *9/18, 9/26, 63/02, 63/06*
U.S. Cl. 316—19 **4 Claims**

1. A process for the preparation of a fluorescent display device of the type which is fitted with segmentary anodes, controlling grid electrodes, and supports for a thermal electron emitting filamentary cathode, comprising the steps of

providing a flat glass base plate member, printing a conductor paste for lead wires and connecting terminals on the glass base plate member, firing the thus-printed paste at from 550° to 600° C to obtain the lead wires and connecting terminals, coating an insulating glass paste on the surface of a portion of the glass base plate member other than that portion on which will be subsequently fitted said segmentary anodes, said controlling grid electrodes, and said supports for the thermal electron-emitting filamentary cathode, firing the thus-coated glass paste at from 540° to 590° C to obtain an insulating layer on the glass base plate member, printing a conductor paste for said segmentary anodes on the glass base plate member, firing the thus-printed paste at from 530° to 580° C to obtain the segmentary anodes, coating said latter segmentary anodes with fluorescent material, fitting said controlling grid elec-



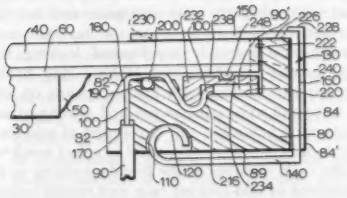
trodes and said supports for the filamentary cathode respectively to said lead wires, fusion bonding a glass panel member to said glass base plate member to cover said segmentary anodes, said controlling grid electrodes and said cathode, said fusion bonding step comprising coating a fusion bonding glass paste comprising a resin and a solvent on at least one of said members along the portions to be fusion bonded together, drying said at least one paste-coated member, preliminarily firing said paste-coated member while keeping the latter separated from said other member to entirely remove from said paste-coated member the resin and solvent contained in said paste, and finally firing said two members in mated position at from 350° to 580° C to form an assembled mass which is subsequently subjected to evacuation, hermetical sealing, gettering and aging to thereby obtain said fluorescent display device.

4,023,877

MEANS FOR COUPLING A CONNECTOR CABLE TO CONTACTS ON A SUBSTRATE

William M. Hennessey, Somerville; Bernard Caras, Princeton; John Steckowich, Jr., Edison, and Frederick E. Bratro, Scotch Plains, all of N.J., assignors to Burroughs Corporation, Detroit, Mich.

Filed Oct. 23, 1975, Ser. No. 624,736
Int. Cl.² H05K *1/12*; H01R *13/54*
U.S. Cl. 339—17 F **6 Claims**



1. An electrical connector for an electrical component carrying a series of contacts on a substrate, an insulating body having a connector surface adapted to

support a flat insulated cable having a plurality of conductors, each of which is adapted to contact one of said contacts on said substrate when said cable is positioned on said connector surface and said substrate is seated on said connector surface,

a flexible support adjacent to said connector surface on which said conductors rest and which serves to press said conductors against said contacts,

a leaf spring pivotally coupled at one end to said body and adapted to be locked in place on said connector with a portion engaging said substrate and securing together said connector and said substrate, with said conductors in contact with said contacts on said substrate, and

a pair of walls projecting from said rear surface of said body, between which a portion of said leaf spring is disposed,

an auxiliary plate seated on said cable to hold it in place, and

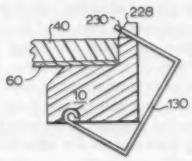
a guide member formed on a portion of said top surface of said body and engaging a portion of said auxiliary plate and a portion of said component to properly position the contacts on said substrate with respect to said conductors.

4,023,878

ELECTRICAL COUPLING MEANS

William M. Hennessey, Somerville, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Oct. 23, 1975, Ser. No. 624,737
Int. Cl.² H05K *1/12*; H01R *13/54*
U.S. Cl. 339—17 F **5 Claims**



1. An electrical assembly for coupling together two devices comprising

an insulating body having a top surface, a bottom surface, and a rear surface, said top surface being adapted to support a device to be seated thereon, and

a generally U-shaped leaf spring having a first end and a second end and pivotally and detachably coupled at said first end to said bottom surface of said body and adapted to be rotated in a first direction and locked in place engaging said device and pressing said device into engagement with said top surface,

said leaf spring having, at said second end, projecting tab portions which engage a cooperating portion formed on said body to prevent said spring from being detached from said body when said spring is rotated in a direction opposite to said first direction to remove it from contact with said device to permit said device to be removed from contact with said body,

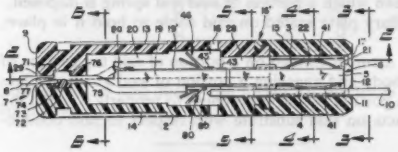
said spring being generally U-shaped and including a first wall, a second wall, and a third wall, and when said spring is locked in place and couples together a device and said body, said first wall lies parallel to and extends along the greater portion of said bottom surface of said body, said second wall lies parallel to and extends along all of said rear surface of said body, and said third wall lies parallel to and extends along the greater portion of said top surface of said body.

4,023,879

ADJUSTABLE ELECTRICAL CONNECTOR WITH REPLACEABLE CONTACT SUB-ASSEMBLY AND VARIABLE STRAIN RELIEF

Kenneth W. Braund, Willoughby, and John T. Venaleck, Painesville, both of Ohio, assignors to A.P. Products Incorporated, Painsville, Ohio

Filed Oct. 20, 1975, Ser. No. 623,673
Int. Cl.² H01R 29/00
U.S. Cl. 339—31 R 14 Claims



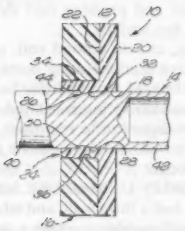
1. A socket-type electrical connector, comprising an electrically non-conductive housing having an interior compartment and opening means in the former for providing access to the latter; and a contact sub-assembly positioned in said compartment, said contact sub-assembly including electrically conductive bow contact means aligned with said opening means for engaging with an electrically conductive member inserted into the same, said bow contact means comprising a deformable curved bow portion, a reverse curved transition portion and a substantially linear attaching portion, said attaching portion of said bow contact means when in free unstressed condition defining an acute angle with a line drawn between opposed ends of said bow contact means, a substantially planar carrier means for supporting said bow contact means at said attaching portion and at the opposite end of said bow contact means relative to said attaching portion, and said bow contact means being deformable to place said attaching portion in a substantially planar abutting relation with said carrier means, whereby a pre-stressed region of moment is created in said transition portion and said attaching portion is maintained under zero stress as a region of zero moment within a predetermined range of deformations of said bow portion, said contact sub-assembly being removable from said housing for replacement by a similar contact sub-assembly having different size and spacing parameters for effective electrical connection with electrically conductive members of corresponding parameters.

4,023,880

CONTACT RETENTION ASSEMBLY

Lloyd J. Powell, Newmarket, Canada, assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 9, 1974, Ser. No. 496,047
Int. Cl.² H01R 9/16
U.S. Cl. 339—59 R 1 Claim



1. A rear insertion front release electrical connector contact retention assembly comprising:

an insulator having a passage therethough from a front face to a rear face thereof;

a contact having a forward contact engaging end, a rear termination end for connection to a wire and an annular groove between said ends, said contact being mounted in said passage with said contact engaging end and groove forward of said front face;

radially resilient contact retention means integral with said insulator extending forwardly from said front face adjacent to said passage, said retention means having an outer surface and a rib on the inner surface thereof engaged with said groove to limit axial movement of said contact in said passage in opposite directions;

a relatively rigid support collar having an opening therein slidably receiving said retention means, the wall of said opening firmly engaging said outer surface of said retention means at least in the region surrounding said rib to provide a rigid support therefor restraining said retention means against radially outward movement thereof; and

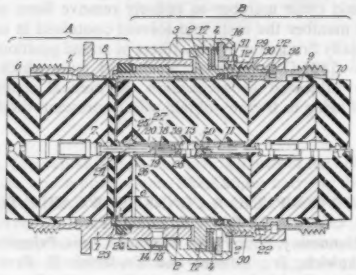
said collar being slidably removable in the forward direction from said retention means allowing said contact to be removed rearwardly from said passage; said retention means comprises a plurality of spaced fingers; and the wall of said opening in said collar embodies a plurality of spaced inwardly extending ridge members interleaved between said spaced fingers.

4,023,881

CONNECTORS

Max Jacques Migneau, Fontenay-aux-Roses, France, assignor to Souriau et Cie, Boulogne-Billancourt, France

Filed Sept. 12, 1975, Ser. No. 612,748
Int. Cl.² H01R 13/54
U.S. Cl. 339—89 R 12 Claims



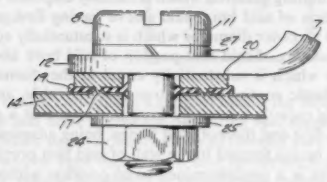
1. A connector comprising male and female members having respective contact elements, at least one male and one female, to be coupled and uncoupled in a plugged-in manner, said female contact element being selectively expandable and contractable so as, respectively, to permit entry of the male contact element with relatively little resistance and to exert relatively increased contact pressure on the inserted male member, an actuatable movable mechanical locking ring carried by said female member, said locking ring having means thereon for cooperating with mating means on said male member to permit axial penetration and joining of said contact elements upon actuation and movement of said locking ring relative to said female member and to effect mechanical locking of the male member to the female member at the end of the movement of said locking ring, and means responsive to said movement and the posi tion of said locking ring for automatically ensuring expansion of said female contact element during the first part of said movement of said locking ring and attendant penetration and joining of said contact elements and automatically effecting contraction of said female contact element during the last part of continued movement and the attendant locking of said members after said penetration and joining.

4,023,882

ELECTRICAL CONNECTOR DEVICE SECURABLE TO METAL MEMBER

Börge Hugo Pettersson, Ekringen 17, S-582 69 Linkoping, Sweden

Continuation of Ser. No. 569,208, April 18, 1975, abandoned. This application May 10, 1976, Ser. No. 685,122
Claims priority, application Sweden, Apr. 25, 1974, 7405545
Int. Cl.² H01R 9/08
U.S. Cl. 339—96 9 Claims



1. A device for providing a good and durable mechanical and electrical connection between an electrical conductor and an object member even though the object member may have an electrically insulating surface coating that is required to remain intact except in a limited zone of electrical connection, said device comprising:

A. a rigid connector element of electrically conductive material having a substantially flat surface that faces substantially in one direction;

B. means on a portion of said connector element other than its said surface for connecting an electrical conductor to it;

C. substantially hard electrically conductive contact means on said connector element, projecting a distance in said one direction from said surface thereof and tapering to an edge remote from said surface that is capable of penetrating a surface coating on an object member, said contact means being spaced from the edges of said surface of the connector element,

D. a sealing element of elastically deformable material

1. bonded to and overlying substantially the whole of said surface of the connector element,

2. having a substantially flat surface parallel to said surface of the connector element and spaced in said direction more than said distance therefrom, and

3. completely embedding said contact means; and

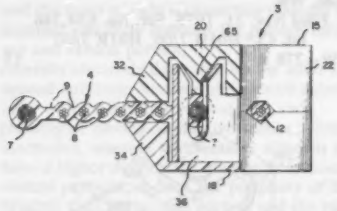
E. force exerting and maintaining means engaging a portion of said connector element other than said surface thereof and comprising a part which is movable relative to the connector element, said force exerting and maintaining means being cooperable with an object member for compelling substantially translatory motion of the connector element in said one direction whereby the sealing element is compressed between the connector element and a surface portion of the object member while the contact means is forced through the sealing element and into penetrating engagement with said surface portion of the object member, and for confining the connector element in a position relative to the object member at which such engagement is maintained while the compressed sealing element cooperates with the connector element and the object member to maintain a seal all around the zone of such engagement.

4,023,883

TAP CONNECTOR FOR USE WITH STRANDED WIRE

Henry James Raposa, and Robert John Tennant, both of Seminole, Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 8, 1975, Ser. No. 575,556
Int. Cl.² H01R 9/08
U.S. Cl. 339—98 9 Claims



1. A connector for establishing electrical contact with an insulated conductor, said connector comprising:

a single terminal of resilient conductive metal, said terminal being bent so that first and second segments of said terminal occupy intersecting planes, said first and second segments each having one slot extending inwardly from one longitudinal edge and having a width only slightly less than the diameter of the conductive core of said conductor, said slots being equally spaced from the intersection of said planes,

first and second flanges on said terminal, said flanges being respectively located adjacent to said first and second segments and comprising the opposite end portions of said terminal, said flanges being bent with respect to said segments so that said flanges are generally parallel to the line joining said two slots, and

an insulating housing having means for supporting said terminal, said housing having anchoring means for supporting both sides of said flanges, whereby

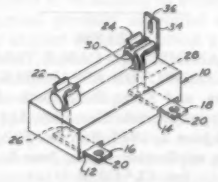
said conductor may be inserted into both of said slots so that electrical contact may be established between said terminal and said conductor since said slots penetrate said insulation establishing contact with the underlying conductive core.

4,023,884

AUXILIARY TERMINAL FOR CARTRIDGE FUSES

Marcus L. Morlan, R.D. No. 1, Box 27, Richmond, Ohio 43944

Filed Aug. 27, 1975, Ser. No. 608,066
Int. Cl.² H01R 11/22
U.S. Cl. 339—258 F 1 Claim



1. An end cap terminal for cylindrical cartridge fuses and which is developed from a generally H-shaped blank having generally parallel vertical legs, a horizontal connecting section and a generally vertical terminal strip on said connecting section between said legs, said legs being bent concavely upwardly, and each opposite end of said connecting section being bent at a generally right angle to bring said concave legs in facing relationship with each other, and whereby said concavely bent legs will surround the cap of a cylindrical cartridge

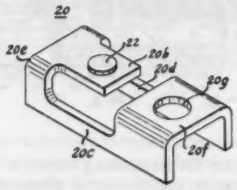
fuse with the vertical terminal strip being positioned against the end of the fuse.

4,023,885

ELECTRICAL TERMINAL

Albert C. Snowdon, Shorewood, and William G. Dennison, Cedarburg, both of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Nov. 21, 1975, Ser. No. 634,246
Int. Cl.² H01H 1/06; H01R 3/00
U.S. Cl. 339—278 R 15 Claims



1. An integral electrical contact terminal comprising a generally E-shaped portion comprising;

a longitudinal horizontally planar middle segment flat throughout its length and having a contact mounted thereto for engagement by another contact mounted to a conductor such that current flow rightwardly through said middle segment then vertically through said contacts then leftwardly through said conductor forms a current loop which induces a magnetic field exerting a longitudinally directed blow-out force on arcing between said contacts;

a pair of lateral segments extending frontwardly and rearwardly from opposite front and rear sides of the left end of said middle segment; and

a pair of longitudinal outer segments extending rightwardly from said lateral segments;

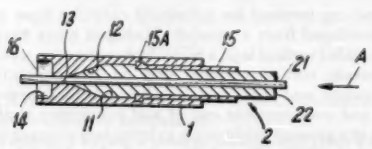
each of said lateral segments being bent downwardly about a longitudinal axis such that current flow leftwardly through said outer segments is directed upwardly and laterally inwardly through said lateral segments to meet at said middle segment and flow rightwardly therethrough, said bends about said longitudinal axes providing accurate establishment of the vertical height of said middle segment above said outer segments to minimize tolerance deviations in the point of engagement of said contacts when said terminal is supported by said outer segments and affording open vertical access to said middle segment from both above and below during attachment of said first mentioned contact.

4,023,886

OPTICAL TRANSMISSION CABLE TERMINAL AND CONNECTOR APPARATUS

Osamu Nakayama, and Keizo Baba, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed June 2, 1975, Ser. No. 582,926
Claims priority, application Japan, June 5, 1974, 49-63777
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 4 Claims



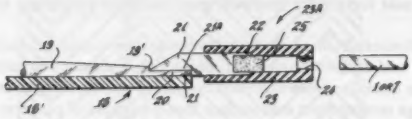
1. A terminal member for an optical transmission cable, said cable having an inner fiber and an outer thermoplastic coating, said terminal member being formed of metal and being of symmetrical cross-section with respect to its central axis and defining a bore extending axially there-through, said bore having a first portion of relatively large inner diameter, that is larger than the outer diameter of said thermoplastic coating, extending inwardly, from one end of said terminal member, a recess formed in the wall of said first portion at a point predetermined distance from said one end, a second portion having a relatively small inner diameter, which is substantially equal to the diameter of said fiber, extending inwardly from the other end of said terminal member, and a tapering portion extending between said first and second portions, wherein the improvement comprises a sleeve-like guide member of a thermally insulating material which is radially disposed within said first portion of said bore, said sleeve having first and second ends and an outer diameter which is substantially equal to the inner diameter of said first portion of said bore and an inner diameter which is substantially equal to the diameter of the thermoplastic coating of said transmission cable, and a flange extending radially outwardly from said sleeve at a point adjacent to a first end thereof, said flange, being adapted to extend into said recess formed in the wall of said first portion to hold said sleeve is a predetermined axial position within said first portion of said bore.

4,023,887

OPTICAL COMMUNICATION, SWITCHING AND CONTROL APPARATUS AND SYSTEMS AND MODULAR ELECTRO-OPTICAL LOGIC CIRCUITS, AND APPLICATIONS THEREOF

Daniel E. Speers, Westport, Conn., assignor to General Optimation, Inc., Southport, Conn.

Continuation of Ser. No. 301,944, Oct. 30, 1972, abandoned.
This application Apr. 4, 1975, Ser. No. 565,153
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 3 Claims



1. A mechanical and optical connector for making a light radiation transmitting connection between two optically transparent elements comprising a stiffly flexible opaque tubular sleeve, an optical contact element of transparent material having a transparent shank portion extending into a first end of said sleeve and having a projecting tip end with a flat area on said projecting end adapted to seat in optical contact with another mating contact element for making said connection therebetween, the second end of said sleeve having an axial opening for receiving an optical strand inserted therein adjacent to the shank portion of said contact element, and said flat area on said projecting tip of said contact element extending in an axial direction defined by a notch in said tip which also provides a stop shoulder extending transversely of said tip.

4,023,888

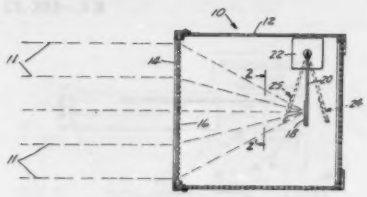
FLASHING RETROREFLECTING DEVICE

Bryan L. Klaenhammer, Hugo, and William H. Long, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sept. 12, 1975, Ser. No. 612,754
Int. Cl.² G02B 5/12
U.S. Cl. 350—99 13 Claims

1. In a signalling device comprising a housing; a lens positioned in an opening in said housing for receiving light, a reflector within said housing substantially at the focal plane of

said light receiving lens, which reflector receives and reflects light from said light receiving lens along an optical path toward said lens, and reflectance control means for varying said optical path, the improvement wherein said lens comprises at least one converging Fresnel lens and said reflectance control means includes means periodically interposed into said optical path to thereby vary said path, said reflectance



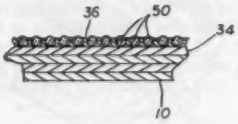
control means comprising a support means for supporting said reflector and drive means for oscillating said support to cause said reflector to periodically move to thereby vary said optical path, whereby light incident on said device such as that provided by vehicle headlights is periodically variably reflected, thus accentuating the detection of the reflected light, affording a flashing signal light to an observer of said device.

4,023,889

RETROREFLECTIVE LAMINATE

Beverly M. Eagon, Hudson; Russell L. Carlson, Tallmadge, and Raymond C. Fry, Stow, all of Ohio, assignors to Morgan Adhesives Company, Stow, Ohio

Filed Feb. 24, 1975, Ser. No. 552,325
Int. Cl.² G02B 5/128
U.S. Cl. 350—105 **11 Claims**



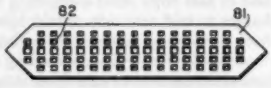
1. A retroreflective laminate comprising a resilient weather and solvent resistant acrylic face layer, a primer layer on the back surface of the face layer, a binder layer on and bonded to the primer layer, a layer of glass beads embedded in the binder layer and protruding therefrom away from the primer layer, a sealer layer over the binder layer and protruding glass beads, and a spacer layer bonded to the sealer layer and having a reflective metal film on the face thereof spaced from the sealer layer, all of such layers being substantially transparent and having good optical properties, the binder, sealer and spacer layers all primarily comprising polyvinyl butyral, and the primer layer being nitrocellulose.

4,023,890

ELECTRO-TRANSMISSIVE DISPLAY DEVICE

Shinichi Shirasu, and Yasushi Nomura, both of Tokorozawa, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed July 31, 1975, Ser. No. 600,574
Claims priority, application Japan, Aug. 7, 1974, 49-90636
Int. Cl.² G02F 1/16
U.S. Cl. 350—160 LC **4 Claims**



1. In a display device of the light transmitting type, wherein the device includes at least one pattern having a periphery and central portion within the periphery;

first and second substrates of insulating material having inner surfaces facing one another.

a layer of light transmitting material disposed between the substrates;

a plurality of segment electrodes deposited on the inner surface of the first substrate between the first substrate and the layer of light transmitting material wherein each segment electrode contains the pattern having a periphery and central portion;

a common electrode deposited on the inner surface of the second substrate between the second substrate and the layer of light transmitting material; and

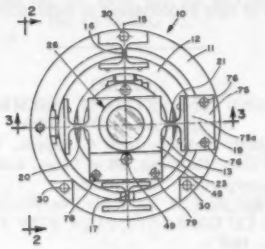
a plurality of electro-conductive sections forming segment electrodes, wherein said sections adjacent the periphery have a higher distribution density than those forming the central portions, so that the periphery of the pattern is brighter than the central portion and the pattern has the same visual impact as a pattern with a constant distribution density.

4,023,891

ADJUSTABLE MIRROR MOUNT ASSEMBLY

Curt H. Chadwick, Sunnyvale, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.

Filed Dec. 15, 1975, Ser. No. 642,125
Int. Cl.² G02B 5/08
U.S. Cl. 350—288 **7 Claims**



1. An adjustable mirror mount assembly comprising

a frame adapted to be secured to utilization apparatus,

an outer gimbal pivotally supported on and within said frame for angular movement about a first axis,

an inner gimbal pivotally supported on and within said outer gimbal for angular movement about a second axis perpendicular to said first axis,

a mirror supported on said inner gimbal,

a first adjusting screw supported on said outer frame for axial movement transversely of the plane of the mirror and engageable with said outer gimbal offset from said first axis,

a second adjusting screw supported on said outer frame for axial movement transversely of the plane of the mirror and engageable with said inner gimbal offset from said second axis,

first locking means operationally independent of said screws extending between said outer gimbal and said frame for selectively locking same together, and

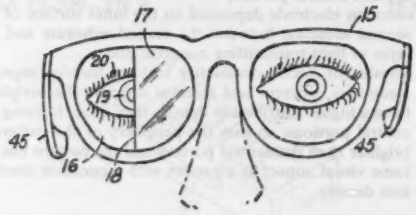
second locking means operationally independent of said adjusting screws extending between said outer and inner gimbals for selectively locking same together.

4,023,892

DAZZLE PROTECTION SPECTACLE DEVICES FOR NOCTURNAL DRIVERS OF MOTOR VEHICLES

Robert Smith, No. 122 Edge View Lane, Rochester, N.Y. 14618

Filed Nov. 20, 1969, Ser. No. 878,449
The portion of the term of this patent subsequent to Nov. 17, 1992, has been disclaimed.
Int. Cl.² G02C 7/16, 9/00
U.S. Cl. 351—45 14 Claims



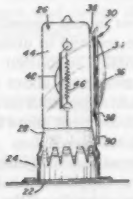
1. In a dazzle protection device for nocturnal drivers of motor vehicles which drivers have binocular vision out of two eyes, a screen element positioned continuously in front of only a predetermined one of the two eyes of the driver when the device is worn by the driver, the other of said two eyes being entirely unshielded, and means for carrying said screen element, said means for carrying being adapted for releasable attachment to the driver; said screen element when the device is worn, covering the inward part of the surface of said one eye, commencing from the inward end of one eye and extending predetermined distances toward the outer end of said one eye and above and below said one eye; the most outer edge of said screen element being substantially upright and crossing said eye; said screen element being of a material having the quality that it will sufficiently shield the eye against the levels of brightness of light encountered in night driving.

4,023,893

LAMP AND LENS RETROFIT ASSEMBLY FOR OVERHEAD PROJECTOR

Roger T. Hebert, Peabody; John A. Pappas, Winthrop, and Richard J. Shea, Hathorne, all of Mass., assignors to GTE Sylvania Incorporated, Salem, Mass.

Filed June 28, 1976, Ser. No. 700,656
Int. Cl.² G03B 21/14, 21/20; F21V 33/00
U.S. Cl. 353—100 7 Claims



1. A retrofit assembly in combination with an overhead projector having a light source support means with a lamp socket mounted thereon, said retrofit assembly comprising:

a lamp having a base removably mounted in said socket on said support means;

a lens holding bracket means removably mounted on said support means and positioned with the lens thereof in close proximity to and in alignment with said lamp;

resilient pivoting means for said lens holding bracket means whereby the lens thereof may be swung away from said lamp to facilitate removal or replacement of the lamp, said bracket means normally being urged toward said lamp by said resilient pivoting means; and

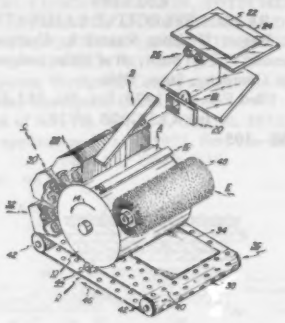
a first tab extending from said lens holding bracket means for striking the base of said lamp when said resiliently urged bracket means is in its normal position, thereby retaining said lens at a predetermined distance from said lamp.

4,023,894

TRANSFER APPARATUS

Narendra S. Goel, Henrietta, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 420,747, Nov. 30, 1973. This application July 11, 1975, Ser. No. 595,196
Int. Cl.² G03G 15/00
U.S. Cl. 355—3 R 5 Claims



1. In an electrostatographic printing system in which an image of imaging material on an image supporting member is transferred at a transfer station to copy sheets using electrical transfer fields generated by an electrical transfer corona charge generator, and wherein a copy sheet supporting belt with front and rear sides transports said copy sheets through said transfer station for said image transfer with said copy sheets supported on said front side of said belt for transfer juxtaposition with said image supporting member, the improvement wherein:

said copy sheet supporting belt comprises a thin solid uniform material of a thickness of approximately 0.76 to 2 millimeters between said front and rear sides and having a multiplicity of vacuum apertures between said front and rear sides with openings of greater than approximately 0.5 millimeters;

vacuum means are provided for applying vacuum forces through said copy sheet supporting belt vacuum apertures from the rear side of said belt to retain a copy sheet on said front side of said belt in said transfer station;

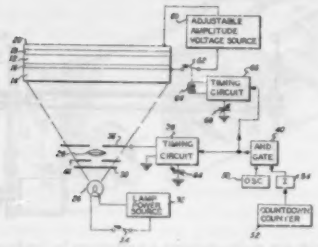
said transfer corona generator faces, but is spaced from, said rear side of said copy sheet supporting belt to apply transfer charges to said rear side of said belt, and

said copy sheet supporting belt comprises an electrically relaxable material for resistively conducting said transfer charges from said rear side to said front side of said belt in said transfer station to avoid transfer discontinuities from said vacuum apertures.

4,023,895
ELECTROSTATOGRAPHIC APPARATUS

John F. O'Brien, Webster, and Oscar G. Hauser, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 518,138, Oct. 25, 1974. This application Oct. 23, 1975, Ser. No. 625,338
Int. Cl.² G03G 15/044
U.S. Cl. 355—3 R 6 Claims

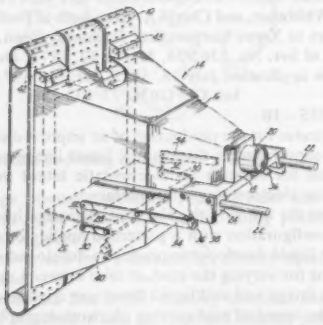


1. An electrostatographic imaging apparatus comprising:
a body of photoconductive material having a surface thereof;
a body of dielectric material having a surface thereof positioned in virtual contact with said photoconductive surface wherein an air gap exists between a portion of said surfaces; and,
pulse imaging means for exposing the photoconductive body to electromagnetic radiation in image configuration and applying a potential difference between said dielectric body and said photoconductive body, said potential difference having a magnitude for causing ionization in said air gap whereby an imagewise charge pattern which is formed at said surface of said photoconductive body is transferred to said dielectric body surface to form an electrostatic charge pattern thereon, and for repeatedly interrupting the application of either said potential difference or exposure to activating radiation or both.

4,023,896
CLEAN MARGIN MECHANISM FOR ELECTROSTATIC COPIERS

Robert M. Koch, Wheaton, Ill., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 7, 1975, Ser. No. 602,582
Int. Cl.² G03G 15/00
U.S. Cl. 355—3 R 2 Claims

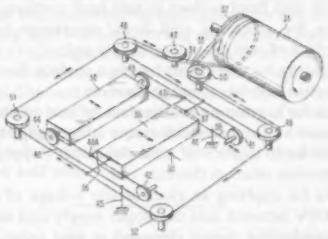


1. A variable magnification imaging system for producing on the lead portion of a photoconductive sheet and registered with the lead edge thereof an electrostatic latent image exposure field including a centrally arranged data area while assuring a nonreproducing trailing end of the sheet, comprising:
holder means for positioning a photoconductive sheet on a receiving plane with its lead edge in a standard registry position;
movable focusing means for projecting the electrostatic latent image exposure field including the centrally arranged data area upon said plane, registered with respect to a lead edge of a sheet in said standard registry position regardless of the magnification setting of said focusing means;
shield means for dividing said receiving plane into a leading image exposure field and a trailing blanket illumination field;
means responsive to the movement of said focusing means for moving said shield means to a location coordinated with the magnification setting of said focusing means, such that the shield means divides the receiving plane at a line extending across the latent image exposure field outside of the data area and within the limit of the latent image exposure field to embrace the data area within the leading image exposure field; and
means for flooding said blanket illumination exposure field with charge eliminating energy.

4,023,897
OPTICS DRIVE MECHANISM

William D. Clark, Longmont, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 28, 1976, Ser. No. 653,067
Int. Cl.² G03G 15/30
U.S. Cl. 355—8 20 Claims

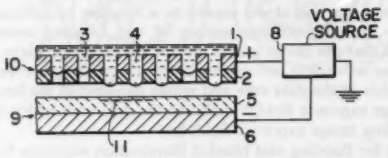


17. A copying machine of the type having a document illumination/optics mechanism which reciprocates during a copy cycle, a photoconductor surface movable in a cyclic path, and a drive coupling for synchronizing said mechanism movement to said surface movement, comprising:
drive means for moving said surface in one direction,
a drive sprocket connected to rotate as a result of said surface movement,
an idler sprocket spaced from and mounted coaxially with said drive sprocket,
two rotatable members mounted to rotate on fixed axes intermediate said sprockets,
means including said two rotatable members continuously connecting said drive sprocket to said idler sprocket,
arcuately reciprocating means connected in sequence to said drive sprocket, one of said rotatable means, said idler sprocket, and the other of said rotatable means, and
means connecting said reciprocating means to effect movement of said mechanism.

4,023,898
ELECTROSTATIC DEVELOPING APPARATUS

Genji Ohno, Yokohama, and Elichi Inoue, Tokyo, both of Japan, assignors to Research and Development Laboratories of Ohno Co., Ltd., Japan

Continuation of Ser. No. 233,546, March 10, 1972, abandoned. This application May 30, 1975, Ser. No. 582,361
Int. Cl.² G03G 15/10
U.S. Cl. 355—10 18 Claims



11. Electrostatic printing apparatus for developing an electrostatic latent image, with a liquid developer containing a water soluble coloring material, comprising:

a developer supply unit composed of an electrically conductive substrate forming a back surface of said developer supply unit, and a liquid repellent layer disposed within a range of 3 to 400u thick over said conductive substrate, forming a front surface of said developer supply unit and defining a boundary between said conductive substrate and said liquid repellent layer, said developer supply unit having uniformly closely spaced 10 to 100u pores in said conductive substrate and liquid repellent layer extending from said front surface to said back surface;

means for supplying said liquid developer to said back surface of said developer supply unit;

a photoconductive means having a surface for retaining an electrostatic latent image thereon,

means for contacting said surface of said photoconductive means having said electrostatic latent image thereon with said front surface of said developer supply unit in an opposing relation thereto; and

means for applying an electrostatic voltage of about 30 to 2000V between said developer supply unit and said photoconductive means disposed in said opposing relation thereto;

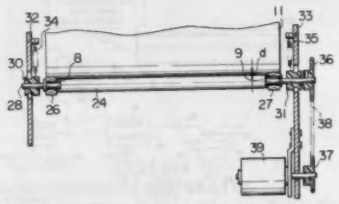
said liquid repellent layer being a material having a property of forming in said pores therein and on said front surface thereof a surface tension contact angle more than 90° with said liquid developer in the absence of said applied electrostatic voltage thereby preventing said liquid developer from flowing into said pores therein, and of forming a surface tension contact angle smaller than 90° in the presence of both said electrostatic image and said applied electrostatic voltage, thereby allowing said liquid developer to flow into said pores therein and onto said front surface thereof from said boundary;

whereby said liquid developer in said pores of said developer supply unit exposed to said electrostatic field and said electrostatic latent image flows through said pores to exude onto said front surface of said developer supply unit and adhere to said surface of said photoconductive means, thereby developing the electrostatic latent image thereon.

4,023,899
EXCESS DEVELOPING LIQUID REMOVING DEVICE FOR ELECTROPHOTOGRAPHY

Toshio Hayashi, and Osamu Haruyama, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed June 25, 1975, Ser. No. 590,244
Claims priority, application Japan, June 29, 1974, 49-77026[U]
Int. Cl.² G03G 15/10
U.S. Cl. 355—10 8 Claims



1. In an electrophotographic device having a moving photoconductive member and means for applying liquid developer to the surface of the photoconductive member, the combination therewith of:

an electrically conductive shaft disposed downstream of said means, the axis of the shaft being perpendicular to the direction of movement of the photoconductive member;

an electrically conductive roller integrally fixed for rotation with the shaft, the shaft extending external of the ends of the roller;

two rolling contact bearings supported by the respective ends of the shaft, the outer diameters of the bearings being greater than the diameter of the roller, the outer surfaces of the bearings rollingly engaging with the surface of the photoconductive member;

drive means to rotate the shaft so that the surface of the roller moves in a direction opposite to the surface of the photoconductive member, the drive means being electrically insulated from the shaft;

first electrical insulating means covering the surface of the roller; and

second electrical insulating means disposed between the ends of the shaft and the respective bearings.

4,023,900
VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHICS APPARATUS

Gary L. Whittaker, and Cheryl A. Hess, both of Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 236,934, March 22, 1972, abandoned. This application July 18, 1975, Ser. No. 597,045
Int. Cl.² G03G 15/10
U.S. Cl. 355—10 9 Claims

1. Apparatus for the production of an improved electrostatographic copy from an electrostatic latent image comprising:

a. means for forming an electrostatic latent image on a moving electrostatographic surface;

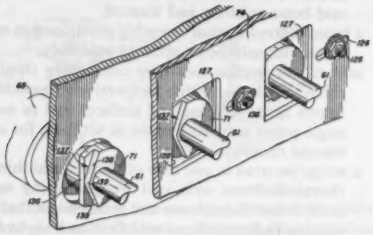
b. means for bringing the electrostatic image into developing configuration with a patterned applicator containing polar liquid developer to produce a developed image; and

c. means for varying the contact time between said electrostatic image and said liquid developer applicator by varying the speed of said moving electrostatographic surface to thereby change the amount of liquid developer deposited on the surface areas of relatively low potential without significantly affecting the amount of liquid developer deposited in areas of relatively high potential.

4,023,901
REPRODUCTION MACHINE SERVICE CONTROL

Ihor Kulbida; Robert E. Kalvitis, both of Fairport, and Robert C. Hurst, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 6, 1975, Ser. No. 619,760
Int. Cl.² G03G *15/00*
U.S. Cl. 355—14 5 Claims



1. The method of operating a reproduction machine having a plurality of discrete operating components cooperable to produce copies, at least one of the operating components being adjustable to permit at least one of the operating parameters thereof to be varied over a range of values, the steps comprising:

presetting said one operating component to a predetermined operating value;

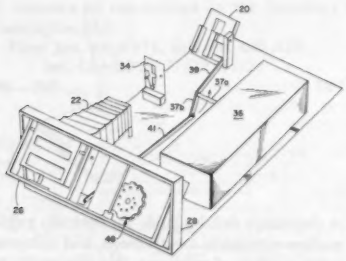
enabling the settings of said one operating component to be varied within preset limits by the machine operator said limits being less than the full range of possible values; and

setting a masterlock to prevent unauthorized adjustment of said operating component setting except to the extent permitted.

4,023,902
INDICIA ENCODING SYSTEM

Warren J. Ungerman, Hatboro, Pa., assignor to West Point Industries, West Point, Pa.

Filed Apr. 12, 1976, Ser. No. 675,915
Int. Cl.² G09C *1/00*; G03B *27/68*; G02B *27/00*; G03B *1/00*
U.S. Cl. 355—52 15 Claims



1. An indicia encoding system comprising, in combination:

a base;

a carriage pivotally mounted on said base and having a rotation mode between an initial tilting position and a final tilting position;

an objective lens and a lens holder fixedly mounted onto said base;

a photosensitive film holder slidably mounted onto a shaft fixedly attached to said carriage and slidably positionable on said shaft in a direction parallel to the pivotal axis of said carriage for exposing to light transmitted through said lens only selected portions of the photosensitive film during each carriage rotation mode so that seriatim, one of a plurality of indicia can individually be encoded on a portion of the film during each rotation mode;

a camera bellows with a first end fixedly attached to said film holder and a second end fixedly attached to said lens holder, said bellows deformable as said film holder moves relative to said lens holder;

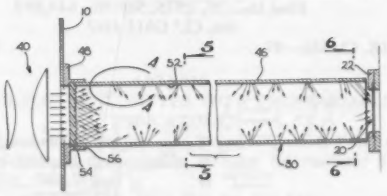
a holder for the indicia to be encoded pivotally mounted on said base and having a rotation mode synchronized to the rotation mode of said carriage; and

a graticule mounted onto the bellows side of said film holder for encoding the data transmitted by the light from the indicia that passes through said graticule onto the film when said carriage and said indicia holder are in synchronized rotational modes.

4,023,903
LIGHT COMPOSER FOR PROVIDING EVEN FIELD ILLUMINATION AND DIFFUSE LIGHT

Harold A. Scheib, Encino, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Aug. 11, 1975, Ser. No. 603,492
Int. Cl.² G03B *27/76*
U.S. Cl. 355—71 27 Claims



1. A light composer for diffusing incident light comprising:

a light mixer including a prismatic housing having a rectangular cross section and at least one reflective inner surface and two ends wherein said light mixer has means for scattering light and for directing said incident light to said surface of said light mixer including a layer of aluminium paint on said inner surface and a plate of optically clear material disposed over substantially all of one of said ends and having a surface formed into an array of semicircular lenses configured in a parallel fashion and having focal lengths substantially less than the length of said housing between said ends.

4,023,904
OPTICAL MICROCIRCUIT PRINTING PROCESS

Ronald E. Sheets, Westminster, Calif., assignor to Tamarack Scientific Co. Inc., Orange, Calif.

Division of Ser. No. 484,564, July 1, 1974, Pat. No. 3,941,475.
This application Jan. 12, 1976, Ser. No. 648,370
Int. Cl.² G03B *27/02*
U.S. Cl. 355—132 11 Claims

1. The process of exposing a photosensitive target surface to ultraviolet light, that comprises:

collecting light emitted from an arc source and bringing it to a focus in the plane of the first lenticule matrix of a double lenticule matrix light integrator,

forming by the lenticules of the second matrix multiple, magnified and superimposed images of the illuminated lenticules of the first matrix on said target surface,

establishing a secondary light source by forming an aperture for the light going through said integrator at a plane in proximity to the latter,

collimating the light from said source and which forms said images by passing said light through a collimating lens,

regulating the angle of collimation of said light by selectively adjusting the area of said light source, and

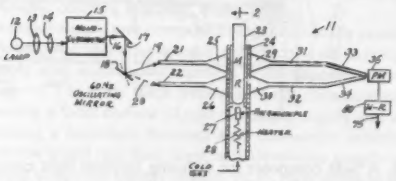
positioning a mask with a geometric pattern of diffraction slits immediately in front of said target surface.

4,023,905

FLASH PHOTOLYSIS SPLIT BEAM SPECTROPHOTOMETER

Britton Chance, c/o Johnson Research Foundation, School of Medicine, University of Pennsylvania, Philadelphia, Pa. 19174

Filed Dec. 29, 1975, Ser. No. 644,863
Int. Cl.² G01J 3/42
U.S. Cl. 356—97 **17 Claims**



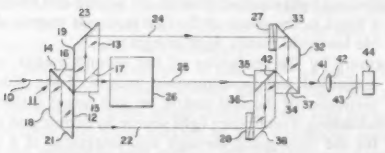
6. An apparatus for measuring the kinetic reactions of a sample, comprising a source of variable wavelength scanning radiation providing two alternating time-shared monochromatic scanning beams, photosensitive means, a transparent sample container, optical guide means defining two respective optical paths traversing spaced portions of said container and respectively receiving said time-shared scanning beams and directing them through said space portions, said optical guide means having means to direct the emergent scanning beams to said photosensitive means, means to derive an absorbance difference spectrum for the two spaced portions from the output of said photosensitive means, and means to flash-photolyze at least one of said spaced portions.

4,023,906

COMPACT THREE-BEAM INTERFEROMETER

Louis Sica, Jr., Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 11, 1976, Ser. No. 695,298
Int. Cl.² G01B 9/02
U.S. Cl. 356—113 **2 Claims**



1. A compact three-beam interferometer which comprises:
a beam splitting assembly;
said beam splitting assembly comprising first and second identical rhombohedrons;
said rhombohedrons having respectively, first and second beam splitting end surfaces with a 45° angle, with an isosceles right angle prism secured to the beam splitting end of each rhombohedron,
said beam splitting ends of each rhombohedron assembled to form a 90° angle, with one face of said isosceles right angle prism secured to said first rhombohedron secured to one face of said second rhombohedron opposite from said beam splitting end thereof;
a beam recombination assembly positioned in optical alignment with said beam splitting assembly,
said recombination assembly comprising third and fourth rhombohedrons which respectively include third and fourth beam splitting end surfaces and as isosceles right angle prism secured thereto as set forth for said first and second rhombohedrons;
a wedge secured to one face of each of said third and fourth rhombohedrons with said wedges facing said first and second rhombohedrons and arranged so that said wedges receive radiation from said first and second rhombohedrons and said third and fourth beam splitting ends receive radiation from said wedges;
an objective lens positioned to receive combined radiation emerging from said third and fourth rhombohedrons;
a Ronchi ruling positioned at the appropriate image plane of said objective lens to receive radiation therefrom; and
a detector-recorder for detecting and recording a signal from said Ronchi ruling.

4,023,907

REFLECTIVE DRILL GUIDE

Sin Kung Chang, 1896 Bough Beeches Blvd., Mississauga, Ontario, Canada

Filed Oct. 7, 1975, Ser. No. 620,264
Int. Cl.² G01C 1/00
U.S. Cl. 356—138 **8 Claims**

1. A disposable drill bit guide for optically guiding a drill bit in a manner normal to a workpiece, and comprising;
a guide portion of relatively thin disposable material said portion having a reflective surface for providing a reflective image of a drill bit and having a predetermined length and width;
adhesive means on one side of said portion for adhesively fastening same on a workpiece with said reflective surface exposed to view, and,
visible guide lines on said portion extending from side to side thereof, said guide lines intersecting one another at right angles, at about the centre of said portion, whereby a drill bit may be centred on such intersection and its image viewed in said reflective surface, and checked with reference to said guide lines, operation of the drill bit removing a central area of said guide portion.

4,023,908

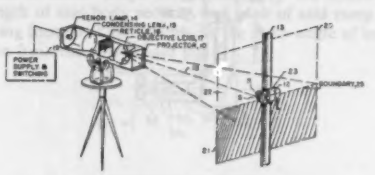
DIRECTION DETERMINING METHOD AND APPARATUS

Philip M. Johnson, Windham, and Richard M. Northrup, Nashua, both of N.H., assignors to Sanders Associates, Inc., Nashua, N.H.

Division of Ser. No. 492,633, July 29, 1974, Pat. No. 3,970,391. This application Jan. 12, 1976, Ser. No. 648,064

Int. Cl.² G01B 11/26

U.S. Cl. 356—152 4 Claims



1. A method of indicating when a signal detector is within a predetermined portion of a boundary between illuminated and unilluminated portions of an image projected at one instant of time, a wave form representing the intensity of the projected image radiation having a finite rise time at said signal detector, comprising the steps of:

providing a first indication if the intensity of the radiation in the illuminated portion of said image in the vicinity of said detector exceeds a first threshold,

eliminating said first indication and providing a second indication if the intensity of the radiation at said detector exceeds a second threshold above said first threshold; and,

eliminating said second indication and providing a third indication if the intensity of the radiation at said detector exceeds a third threshold above said second threshold, said second and third thresholds being adaptive thresholds proportional to the intensity of the radiation in the illuminated portion of said image, whereby the position of said detector relative to the predetermined portion of said boundary is indicated by which of said three indications remains indicating after the projection of said image.

4,023,909

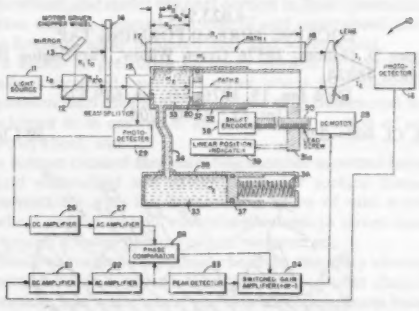
NULL BALANCE ALPHAMETER

Charles C. Ross, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 15, 1976, Ser. No. 649,435

Int. Cl.² G01N 21/22, 21/26

U.S. Cl. 356—205 10 Claims



1. An apparatus for comparing the absorption and scattering of light in a sample fluid with respect to a reference fluid comprising:

means for radiating a beam of light;

means disposed to receive the light beam for generating representative beam signals;

means also disposed to receive the light beam for splitting the light beam into additional first and second parallel components;

means disposed to receive the first parallel component for passing it through the sample fluid;

means disposed to receive the second parallel component for transmitting it through the reference fluid;

means disposed to receive the first and second components from the passing means and the transmitting means for transforming the components into first and second component signals;

means coupled to the generating means and the transforming means for comparing the beam signals and the first and second component signals;

means coupled to the comparing means for changing the dimension of the transmitting means when predetermined amplitude variations among the beam signals and the first and second component signals are detected by the comparing means; and

means connected to the transmitting means for indicating the absorption and scattering of light in the sample fluid when the transmitting means stops changing dimensions.

4,023,910

ELECTRONIC PHOTOMETER WITH TWO VARIABLE INDICATORS

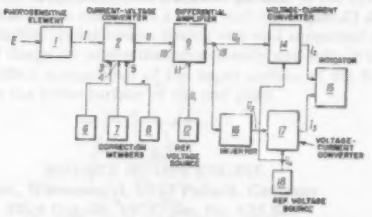
Marc Niederhauser, Boudry, and Pierre Huguenot, Yverdon, both of Switzerland, assignors to Bolex International SA, Ste-Croix, Switzerland

Filed Dec. 11, 1975, Ser. No. 531,661

Claims priority, application Switzerland, Dec. 11, 1973, 17414/73

Int. Cl.² G01J 1/42

U.S. Cl. 356—227 11 Claims



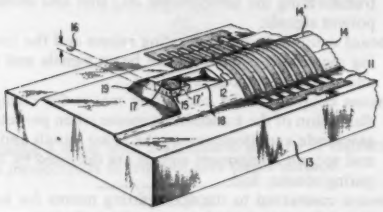
1. In a photometric circuit for determining exposure parameters for taking a scene having a given brightness comprising a photoelectric transducer, evaluation circuit means connected to said photoelectric transducer for producing an output signal whose value is dependent upon the brightness of the scene, a first and second combining device means, each of which is connected to said evaluation circuit means for receiving said output signal, each of said first and second combining device means further connected to a reference voltage source for receiving a reference signal, said first combining device means adapted to combine said output signal and said reference signal by performing a computing operation, said second combining device means adapted to combine said output signal and said reference signal by performing an inverse computing operation, and a first and second indicator connected to said first and second combining device means such that the brightness of said first indicator is inverse to the brightness of said second indicator.

4,023,911

STEREOPSIS TEST PATTERNS FOR ADJUSTMENT OF STEREOMICROSCOPES IN THE INSPECTION OF THREE-DIMENSIONAL OBJECTS

Bela Julesz, Warren; Becky Thomas Kerns, Summit, and Milton Everett Terry, Mountainside, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 12, 1976, Ser. No. 675,771
Int. Cl.² G01N 21/60
U.S. Cl. 356—237 13 Claims



8. A device to aid in the alignment of a stereomicroscope for inspection of three-dimensional objects which comprises:

a. at least one random dot stereogram having left and right images and being of such size that it encompasses approximately the same field of view as the zone of the object to be inspected at the desired magnification; and

b. a transparent holder on which the left and right images are mounted; the left and right images having a vertical separation between them approximately equal to the height of the zone.

4,023,912

SOLID STICK PAN LUBRICANT

Darrell G. Mahler, and Charles Doumani, both of Los Angeles, Calif., assignors to Blue Cross Laboratories, Inc., North Hollywood, Calif.

Continuation-in-part of Ser. No. 537,172, Dec. 30, 1974, abandoned. This application May 11, 1976, Ser. No. 685,364
Int. Cl.² C10M 7/44; B05C 1/02
U.S. Cl. 401—82 29 Claims

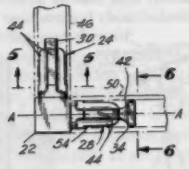
1. Solid stick cookware lubricant consisting essentially per 100 parts by weight of from 10 to 30 parts of lecithin, and from 70 to 90 parts of an ablative base, said base comprising room temperature solid material consisting essentially of fatty alcohol esters selected from hard fats and waxes and a room temperature liquid vegetable oil in proportions of between 40 and 60 parts of said normally solid material and between 30 and 40 parts of said oil, to deposit a lubricating effective layer of lecithin onto the cookware surface with hand pressure wiping.

4,023,913

CONVERTIBLE TUBE CONNECTING SYSTEM

Irving L. Berkowitz, Binghamton, N.Y., assignor to Kason Hardware Corporation, Binghamton, N.Y.

Filed Nov. 4, 1975, Ser. No. 628,584
Int. Cl.² F16B 7/00
U.S. Cl. 403—2 7 Claims



1. A convertible connector for two elongated members having socket-like ends, and wherein either one or both of which members has either a circular or polygonal transverse internal cross section, said connector comprising:

a. a base portion; and

b. at least first and second elongated legs integral with and extending outwardly from said base portion, the longitudinal axes of said legs extending at an angle with respect to each other, said legs comprising:

1. an elongated body portion immediately adjacent said base portion, said body portion having a transverse cross section that is adapted to receive a tubular member having either a circular or a polygonal transverse internal cross section;

2. a fragible neck portion integral with an extending from the end of said body portion that is spaced from said base portion; and

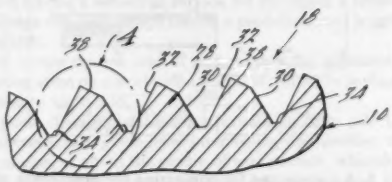
3. a head portion integral with said neck portion, said head portion having a polygonal transverse cross that is adapted to receive a tubular member having a polygonal transverse internal cross section, said head portion being removable by severing said neck portion proximate the juncture thereof with said body portion whereby only thereafter a tubular member having circular transverse internal cross section may be mounted on said body portion, and wherein each said body portion includes at least two longitudinally oriented ribs that extend in substantially radial directions with respect to the axis of said leg, and wherein stop means are formed integrally on said body portion for limiting the free sliding movement of the tubular members thereon in the direction towards said base portion.

4,023,914

LOCKING THREAD FORMING TAP

Horace D. Holmes, 28576 Green Willow, Farmington Hills, Mich. 48024

Filed Jan. 15, 1976, Ser. No. 649,570
Int. Cl.² B23G 5/06
U.S. Cl. 408—220 30 Claims



1. A thread forming tap comprising
a shank section,

a body section extending longitudinally from the shank section,

a helical thread formed on the body section and having radially converging flank portions, an inclined ramp area formed at the end of said flank portions and arranged at a preselected angle to the axis of the tap and adapted to form a complementary inclined ramp at the root of the thread to be formed by the tap,

said thread formed on said body section being of uniform cross-sectional shape for substantially the entire axial length of said body section, and each of said ramp areas being formed at approximately the same angle of inclination from the axis of said tap.

4,023,915

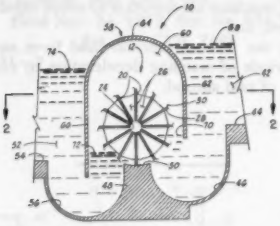
PRESSURIZED WATER WHEEL

William S. Kerby, 5102 N. Seneca, Wichita, Kans. 67204

Filed Aug. 11, 1975, Ser. No. 603,358

Int. Cl.² F01D *1/08, 25/24*

U.S. Cl. 415—2 **5 Claims**



1. A waterwheel and flow directing means therefor, comprising:

a. a waterwheel having a plurality of radially disposed paddles mounted on a shaft in a spaced relation with spaces between said paddles being in open fluid communication at the center portion of the waterwheel,

b. a flow directing means having an entry channel portion in fluid communication with the upstream side of said waterwheel, and outlet channel portion in fluid communication with the downstream side of said waterwheel, and

c. a housing rigidly mounted over said water wheel,

d. a means to pressurize an upper portion of said waterwheel mounted over said water wheel in a stationary position, said means to pressurize being constructed and adapted to in use retain air in an upper portion of said waterwheel, and

e. a bottom channel flow directing member mounted below said waterwheel and having the upper surface thereof contactable with the lowermost portion of said waterwheel paddles as said waterwheel rotates to direct water through a lower portion of said waterwheel,

f. means to maintain a pressure head on the entry channel portion which is greater than that on the outlet channel portion, said water wheel and flow directing means being constructed and adapted to in use receive water in said entry channel portion, pass same beneath said entry wall, through the lower portion of said waterwheel underneath said outlet wall and out through said outlet channel portion.

4,023,916

CYLINDER-CYLINDER HEAD MOUNTING ARRANGEMENT FOR DIESEL-TYPE FUEL INJECTION PUMPS

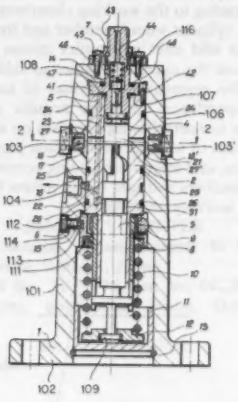
Jaromir Indra, Brno, Czechoslovakia, assignor to Vysoke uceni technicke, Brno, Czechoslovakia

Filed Mar. 29, 1976, Ser. No. 671,119

Claims priority, application Czechoslovakia, Mar. 27, 1975, 2093/75

Int. Cl.² F04B *39/10, 7/04*

U.S. Cl. 417—570 **7 Claims**



1. In an injection pump assembly, an elongated, vertically disposed hollow casing having an upper, centrally apertured end plate, a working cylinder disposed coaxially within the casing, a hollow cylinder head having a lower end, an outwardly projecting first flange intermediate its ends, and a threaded upper end extendable through the central aperture of the end plate, the lower end of the cylinder head extending tightly into the upper part of the cylinder to form a cylinder-cylinder head sub-assembly with the lower surface of the first flange abutting the upper surface of the cylinder, a piston supported for reciprocation in the lower portion of the cylinder, a second flange carried on a lower end of the piston, and means including spring means having one end supported on the second flange for urging the sub-assembly upwardly in the casing to effect engagement of the upper surface of the first flange with the lower surface of the end plate.

4,023,917

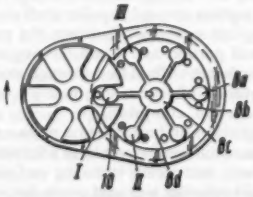
ROTARY PISTON ENGINE

Wolf Klemm, Wiesenweg 4, 8023 Pullach, Germany

Filed Oct. 28, 1975, Ser. No. 625,865

Int. Cl.² F01C *1/08*

U.S. Cl. 418—191 **4 Claims**



1. A rotary piston engine comprising a casing having inlet means and outlet means for an operating fluid, such as gas, steam and liquid, at least one cylinder wheel member having a plurality of cylinder cavities equally spaced in angular rela-

tionship, and at least one piston wheel member having a plurality of piston elements arranged on the outer ends of radially extending protrusions defining segment-like cavities between each other, said wheel members being rotatably mounted in said casing by means of shafts and being in meshing engagement such that expanding and contracting working chambers are generated in said cylinder cavities of said cylinder wheel member as well as in said segment-like cavities of said piston wheel member, said piston wheel member having at least a disc-like commutator valve rigidly connected thereto, said disc-like commutator valve having two types of through passages, the first type of which connects said inlet and outlet means of said casing to the working chambers in said cylinder cavities of said cylinder wheel member and the second type of which connects said inlet and outlet means to the working chambers in both the cylinder cavities of said cylinder wheel member and the segment-like cavities of said piston wheel member in dependence upon the angular position of said wheel elements to exert driving impulses on said wheel members on both sides of said piston elements projecting into said cylinder cavities, said inlet means being connected to expanding working chambers and said outlet means being connected to contracting working chambers.

4,023,918

PUMP

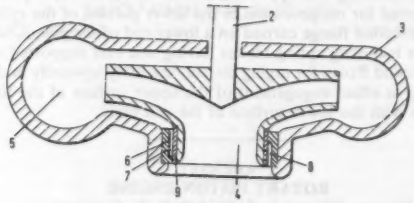
Torvald Ståhl, Alvsjo, Sweden, assignor to ITT Industries, Inc., New York, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,607

Claims priority, application Sweden, Feb. 10, 1975, 7501410

Int. Cl.² F04D *29/08, 29/22*

U.S. Cl. 415—112 **5 Claims**



1. An apparatus for balancing radial forces in rotor dynamic machines, especially centrifugal pumps, which are provided with a pump impeller having an annular axial wall portion provided with a suction eye and impeller shaft mounted within a pump housing and seal means between the pump impeller annular axial wall portion and pump housing wherein, as a result of reaction forces of fluid flow through said pump housing a resultant force influences the impeller and shaft in a certain radial direction, comprising:

means for exposing said impeller to a pressure differential, which pressure differential results in a force opposing said resultant force, said means including seal means coupled between said impeller and said pump housing, said seal means having at least two circumferential notches therein, one of which extends along one-half of the periphery of said seal means and exposed to the inner pressure of the pump housing, and the other of which extends along the other half of said seal means and exposed to a pressure external of said pump housing.

4,023,919

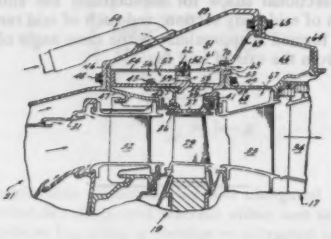
THERMAL ACTUATED VALVE FOR CLEARANCE CONTROL

William R. Patterson, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 534,551, Dec. 19, 1974, Pat. No. 3,966,354. This application Oct. 29, 1975, Ser. No. 626,863

Int. Cl.² F01D *25/24*

U.S. Cl. 415—134 **6 Claims**



1. In a gas turbomachine of the type having a rotor and surrounding shroud operating over a range of temperatures and speeds, a method of maintaining a minimum allowable clearance between the rotor and the surrounding shroud during periods of transient performance, the steps comprising:

a. providing a support for radially positioning the shroud in response to machine speed changes, said support having a relatively low thermal inertia;

b. exposing said support to a thermal fluid flow during periods of machine acceleration to cause rapid growth of said shrowd; and

c. removing the flow of thermal fluid from said support during periods of machine deceleration to cause a slow shrinkage of said shroud.

4,023,920

TURBOMOLECULAR VACUUM PUMP HAVING A MAGNETIC BEARING-SUPPORTED ROTOR

Werner Büchler, Hoffnungsthal; Rüdiger Frank, Cologne, both of Germany; Helmut Habermann, Foret de Vernon Pr., and Maurice Brunet, Vernon, both of France, assignors to Leybold-Heraeus GmbH & Co. KG, Cologne-Bayental, Germany and Societe de Propulsion-S.E.P., Paris, France

Filed Sept. 26, 1974, Ser. No. 509,717

Claims priority, application Germany, Sept. 29, 1973, 2349033

Int. Cl.² F04B *35/04;* **F03B** *5/00*

U.S. Cl. 417—354 **6 Claims**

1. In a turbomolecular vacuum pump including a pump housing; a vertically oriented hollow pump rotor situated in the housing; a vertically upwardly oriented stub shaft affixed to the pump housing and extending into the space surrounded by the hollow pump rotor; the improvement comprising:

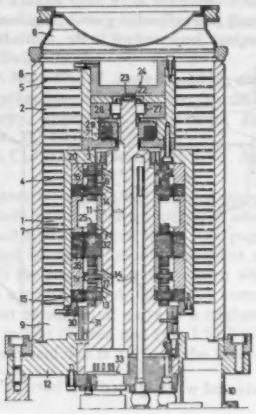
a. a magnetic axial bearing disposed within said space and mounted on said stub shaft and said pump rotor for effecting support of said pump rotor by said stub shaft;

b. two magnetic radial bearings disposed within said space and mounted on said stub shaft and said pump rotor for effecting support of said pump rotor by said stub shaft, said magnetic radial bearings being mounted spaced from one another along said stub shaft;

c. all magnetic bearings effecting support of said pump rotor by said stub shaft being disposed entirely within said space; and

d. an electric drive motor being disposed within said space

between said two magnetic radial bearings; said electric drive motor having a motor stator coil mounted on said



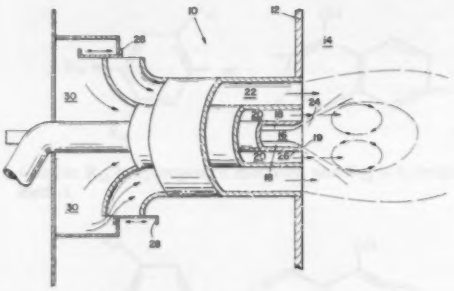
stub shaft and an outer rotor surrounding said motor stator coil and being connected to said pump rotor.

4,023,921

OIL BURNER FOR NO_x EMISSION CONTROL

Donald Anson, Los Altos, Calif., assignor to Electric Power Research Institute, Palo Alto, Calif.

Filed Nov. 24, 1975, Ser. No. 634,702
Int. Cl.² F23L 7/00
U.S. Cl. 431—9 10 Claims



1. A method for producing heat in a liquid fuel burner while suppressing the production of oxides of nitrogen in a flame defining a combustion path with a primary flame zone adjacent the tip of a liquid fuel burner and a secondary flame zone substantially surrounding and extending beyond said primary flame zone along said combustion path comprising the steps of:

continuously injecting a spray of liquid fuel into said primary flame zone while directing a relatively high velocity stream of air in an intersecting manner to create a toroidal fluid circulation pattern such that the oxygen content of the high velocity air stream is approximately 5% of stoichiometric, said air stream atomizing said liquid fuel to form a fluid mixture, whereby liquid fuel is ignited and a stable flame is established in said primary flame zone to produce a gaseous effluent;

introducing recirculated flue gas into admixture with said gaseous effluent immediately after said primary flame zone to substantially increase the molar quantity of said gaseous effluent from said primary flame zone;

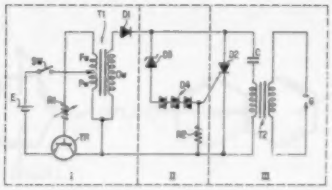
and thereafter combining in said secondary flame zone said gaseous mixture with air in substantially stoichiometric quantity for complete combustion.

4,023,922

SMOKER'S LIGHTER

Kenjiro Goto, Saitama, Japan, assignor to Mansei Kogyo Kabushiki Kaisha, Saitama, Japan

Filed Dec. 18, 1975, Ser. No. 641,815
Claims priority, application Japan, Dec. 20, 1974, 49-155584
Int. Cl.² F23Y 2/28
U.S. Cl. 431—264 28 Claims



1. An electrically-ignited gas lighter comprising:

a casing,

a fuel tank mounted in the casing and having a gas injecting valve and a gas spouting valve with a burner nozzle,

an ignition circuit unit comprising a circuit case accommodating an ignition circuit therein,

the ignition circuit comprising a blocking oscillator having an output terminal and a terminal for connecting a battery through a switch,

a half-wave rectifier connected to the output terminal and for rectifying the output of the blocking oscillator to charge a storage capacitor,

a discharge circuit comprising the storage capacitor, a step-up transformer, and a semi-conductor switching device having a gate;

the step-up transformer having an output winding for connecting an ignition electrode to ignite a fuel gas from the burner nozzle, and

a triggering circuit connected to the gate of the semi-conductor switching device to trigger automatically and periodically the same by means of the charged voltage of the storage capacitor.

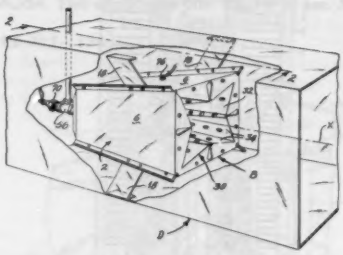
4,023,923

BURNER FOR HEATING AN AIRSTREAM

Frederick A. Kramer, Jr., 12 Glenview Road, Ladue, Mo. 63124

Filed Mar. 18, 1975, Ser. No. 559,514
Int. Cl.[2] F24H *3/04*
U.S. Cl. 432—222 20 Claims

1. A burner for heating an airstream, said burner being disposed in the airstream and comprising: a plurality of chamber walls joined together along their sides to form a combustion chamber having a longitudinal axis oriented generally parallel to the direction of flow for the airstream, each of the walls being closest to the longitudinal axis at the upstream end of the combustion chamber and diverging from the longitudinal axis thereafter so that each wall is located further from the longitudinal axis at the downstream end of the combustion chamber, each of the walls having apertures therein for admitting air into the combustion chamber, each of the walls intermediate its sides bulging inwardly toward the longitudinal axis with the bulges so formed being located at and leading up to the downstream end of the combustion chamber and further becoming more pronounced toward the downstream end, at least some of the apertures being in the bulges; and supply means opening into the small upstream end of the combustion chamber for introducing a combustible substance into the combustion chamber, whereby the combustible substance and



the air will mix and when ignited will burn in the combustion chamber.

4,023,924

CONCENTRATED AQUEOUS DYE COMPOSITIONS CONTAINING A LOW MOLECULAR WEIGHT AMIDE AND THEIR USE FOR DYEING PAPER

Alfred Frei, Binningen; Georg Schoefberger, Basel, and August Schweizer, Muttenz, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Division of Ser. No. 739,213, June 24, 1968, abandoned. This application May 23, 1973, Ser. No. 362,899

Claims priority, application Switzerland, July 13, 1967, 10042/67; Mar. 22, 1968, 4326/68

Int. Cl.[2] D21D *3/00;* D21H *1/46, 3/80*

U.S. Cl. 8—7 18 Claims

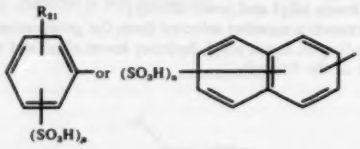
1. In a process for producing colored paper comprising incorporating into paper stock an effective amount of a dye composition and forming paper from said paper stock said effective amount being an amount sufficient to impart the desired color to the paper, the improvement wherein the dye composition is a concentrated, liquid dye composition comprising (i) 1 part by weight of a dye or a mixture thereof, (ii) 0.5–5 parts by weight of urea and (iii) 1 to 8 parts by weight of water, wherein said dye is a dye of the formula

$$R_{11}—N=N—R_{12}—A—R_{14}—N=N—R_{13}$$

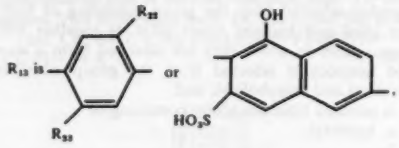
or

$$K_1—N=N—B—N=N—K_2,$$

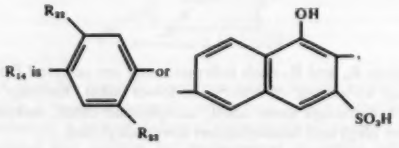
or a salt thereof, wherein each of R_{11} and R_{13} is independently



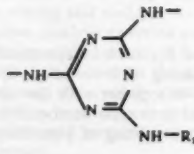
wherein R_{21} is hydrogen, methyl or methoxy, and n is 1 or 2,



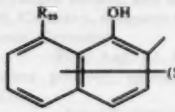
wherein R_{22} is hydrogen or methoxy, and R_{23} is hydrogen or methyl,



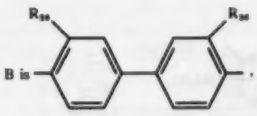
wherein R_{22} is hydrogen or methoxy, and R_{23} is hydrogen or methyl, A is —NH—, —NH—CO—NH—, trans-13 NH—CO— CH=CH—CO—NH— or



wherein R_{24} is hydrogen, phenyl or 3-sulfophenyl, each of K_1 and K_2 is independently



wherein P_{22} is $—NH_2$ or —OH, and



wherein each R_{26} is hydrogen, methyl or methoxy.

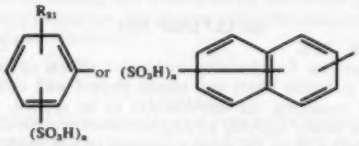
15. In a process for producing colored paper comprising treating paper sheet with an effective amount of a dye composition, said effective amount being an amount sufficient to impart the desired color to the paper, the improvement wherein said dye composition is a concentrated, liquid dye composition comprising (i) 1 part by weight of a dye or a mixture thereof, (ii) 0.5–5 parts by weight of urea and (iii) 1 to 8 parts by weight of water, wherein said dye is a dye of the formula

$$R_{11}—N=N—R_{12}—A—R_{14}—N=N—R_{13}$$

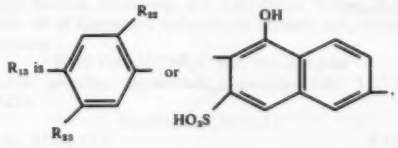
or

$$K_1—N=N—B—N=N—K_2,$$

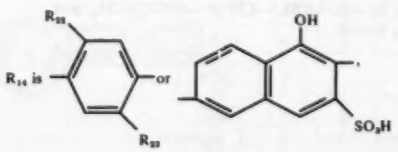
or a salt thereof, wherein each of R_{11} and R_{13} is independently



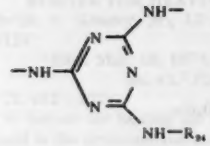
wherein R_{21} is hydrogen, methyl or methoxy, and n is 1 or 2,



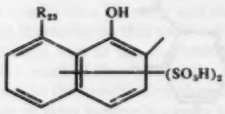
wherein R_{22} is hydrogen or methoxy, and R_{23} is hydrogen or methyl,



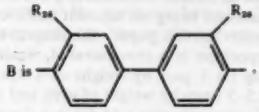
wherein R_{22} is hydrogen or methoxy, and R_{23} is hydrogen or methyl, A is —NH—, —NH—CO—NH—, trans—NH—CO—CH=CH—CO—NH— or



wherein R_{24} is hydrogen, phenyl or 3-sulfophenyl each of K_1 and K_2 is independently



wherein R_{25} is $-NH_2$ or $-OH$, and



wherein each R_{26} is hydrogen, methyl or methoxy.

4,023,925

PROCESS FOR OBTAINING MULTICOLOR EFFECTS

Birgid Fadler née Jack, Hattersheim (Main), and Hans-Peter Maier, Sulzbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

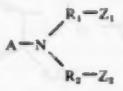
Filed Aug. 14, 1974, Ser. No. 497,484

Claims priority, application Germany, Aug. 16, 1973, 2341427

Int. Cl.² D06P *3/82*

U.S. Cl. 8—21 C **7 Claims**

1. A process for obtaining multicolor effects on textiles made of polyester fibers and blends thereof with cellulosic fibers by modifying the disperse dye to be applied, which comprises locally applying an aqueous solution of an alkaline agent selected from the group consisting of hydroxides, carbonates or triphosphates of alkali metals and mixtures thereof, either thickened or not and free from oxidizing or reducing agents, onto a dried or partially dehydrated unfixed pad-dyeing produced on said fiber material using a disperse dyestuff of the formula



in which

A is a mono or disazo dyestuff residue,

R_1 is a direct bond, $-CH_2-$ or $-C_2H_4-$,

R_2 is $-CH_2-$ or $-C_2H_4-$,

Z_1 is —H, —OH, —CN or —OOC—CH_3, and

Z_2 is —H,

—CN, —OOC—CH_3 or $-C_6H_5$,

allowing the solution to act on the dyeing, thermosoling the material to fix the dyestuff and finishing it in the usual manner.

4,023,926

DIAMINOBENZOQUINONES IN HAIR DYE COMPOSITIONS

Andree Bugaut, Boulogne-sur-Seine, and Monique Laudon, Gagny, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Division of Ser. No. 370,737, June 18, 1973, Pat. No. 3,919,265. This application July 31, 1975, Ser. No. 600,786

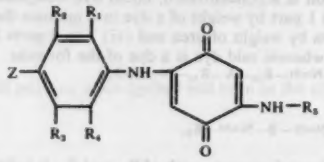
Claims priority, application Luxembourg, Jan. 23, 1973, 65555

Int. Cl.² D06P *3/04*

U.S. Cl. 8—10 **14 Claims**

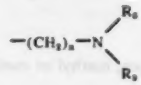
1. A composition for dyeing keratinic fibers comprising a solution in a solvent selected from the group consisting of water and an aqueous alcoholic solution of a diaminobenzoquinone selected from the group consisting of

1. a diaminobenzoquinone having the formula



wherein R_1, R_2, R_3 and R_4 each independently represent a member selected from the group consisting of hydrogen, halogen, lower alkyl and lower alkoxy;

R_5 represents a member selected from the group consisting of hydrogen, lower alkyl, hydroxy lower alkyl and amino alkyl of the formula



wherein n is 2–6 and R_8 and R_9 each independently represent a member selected from the group consisting of hydrogen, lower alkyl and hydroxy lower alkyl or together with the nitrogen atom to which they are attached form a six-membered heterocycle selected from the group consisting of piperidinyl and morpholinyl; and

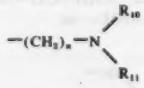
Z is selected from the group consisting of

a. hydroxyl

b.

wherein R_6 and R_7 each independently are selected from the group consisting of hydrogen, lower alkyl, hydroxy lower alkyl, carbamyl lower alkyl, acetylamino ethyl, mesylamino lower alkyl and benzoylamino lower alkyl, and

c.



wherein n is 2–6 and R_{10} and R_{11} each independently are selected from the group consisting of lower alkyl, hydroxy lower alkyl and acetylamino, or together with the nitrogen atom to which they are attached form a six-membered heterocycle selected from the group consisting of piperidinyl and morpholinyl;

2. a salt of the diaminobenzoquinone of (1) with a mineral or organic acid; and
3. the quaternary ammonium salt of the diaminobenzoquinone of (1);

said diaminobenzoquinone being present in an amount effective to dye said keratinic fibers.

4,023,927
TEXTILE CLEANING PROCESS

Alex S. Forschirm, Lake Hiawatha, N.J., assignor to Celanese Corporation, New York, N.Y.

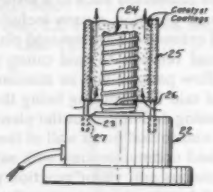
Filed May 8, 1975, Ser. No. 575,817
Int. Cl.² B08B *3/04*
U.S. Cl. 8—137 **5 Claims**

1. A process for preventing wet-soil redeposition and improving stain-release characteristics of polyester textile material which comprises incorporating into the polyester textile material between about 0.0001 and 10 weight percent of hydroxypropyl methyl cellulose based on the weight of polyester fiber in the textile material, by contacting the said textile material with a dry cleaning solvent containing between about 10^{-7} and 1.0 weight percent hydroxypropyl methyl cellulose and between about 0.1 and 1.5 weight percent water, based on the total weight of dry cleaning solvent, prior to the time said textile material is wet laundered.

4,023,928
CATALYTIC FUME CONTROL DEVICE

Vladimir Haensel, Hinsdale, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 396,949, Sept. 13, 1973, abandoned. This application Sept. 19, 1975, Ser. No. 614,809
Int. Cl.² A61L *9/00*; B01J *35/04*; F24H *3/00*
U.S. Cl. 21—74 R **1 Claim**

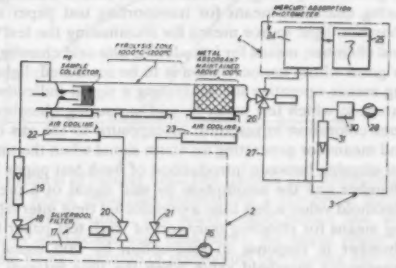


1. A portable catalytic converter device for use in purifying the air in a room or generally small zone, which comprises in combination, a central electrical resistance heat source having a terminal end portion for replacement mounting into an electric current supplying socket, a refractory wall member spaced from said heat source to receive unobstructed radiant heat from the heat source and form an open-ended vertically oriented air passageway therebetween thereby to permit convection flow therethrough, support means for said wall member retaining said wall member spaced from said heat source, an active catalytic covering on the surface of said wall member facing said heat source for catalytically converting combustible components in the air stream flowing through said passageway and over the catalytic coating on the wall member, and a base support means, said heat source and said refractory wall member being mounted upon said base support means.

4,023,929
PROCESS FOR DETERMINING TRACES OF MERCURY IN LIQUIDS

Wolf-Jürgen Becker, and Kurt Schreckling, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 27, 1975, Ser. No. 608,311
Claims priority, application Germany, Sept. 4, 1974, 2442346
Int. Cl.² G01N *31/12, 31/06, 33/18*
U.S. Cl. 23—230 PC **12 Claims**

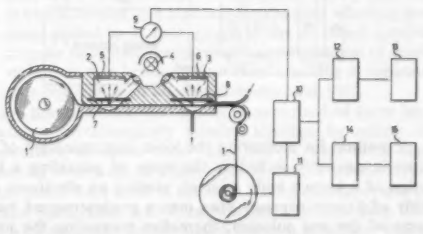


1. A process for the determination of the total mercury content of liquids, wherein the liquid sample to be analysed is collected in a sample collector, subsequently evaporated by heating to temperatures above 1000° C and transferred by a carrier gas into a pyrolysis zone which is maintained at a pyrolysis temperature of from 1000° to 1200° C, and in which the sample is decomposed and the mercury contained in the sample is liberated as mercury vapour, and the carrier gas together with the mercury vapour is passed over a metal maintained at a temperature above 100° C. on which the mercury is absorbed and from which the mercury is subsequently desorbed by heating and transferred by the carrier gas into a mercury adsorption photometer where the mercury is determined quantitatively.

4,023,930
METHOD AND APPARATUS FOR DETERMINING THE CONCENTRATION OF A GAS OR GASES IN A GAS MIXTURE BY SENSING THE COLORATION UNDERGONE BY REAGENT TEST PAPER, OR THE LIKE, IN RESPONSE TO EXPOSURE TO SUCH GAS OR GASES

Otto Blunck, Hamburg; Burkhart Selm, Ahrensburg; Karl-Heinz Retzow, Hamburg, and Karl-Heinz Zorner, Norderstedt, all of Germany, assignors to Maihak AG, Hamburg, Germany

Filed Feb. 18, 1975, Ser. No. 550,646
Claims priority, application Germany, Feb. 15, 1974, 2407224
Int. Cl.² G01N *31/22*
U.S. Cl. 23—232 R **8 Claims**



1. A method of determining the concentration of a gas by

monitoring the coloration of a reagent test paper whose color changes progressively in response to continued exposure to such gas, comprising the steps of determining the length of time which such reagent test paper must be exposed to such gas for the coloration of the test paper to reach a preselected threshold value, comparing the length of time which is required for the coloration to reach said preselected threshold value against a preselected reference time, and exposing fresh test paper to the gas mixture only when the coloration of the previously exposed test paper has reached said preselected threshold value.

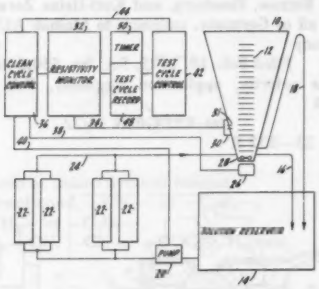
5. An apparatus for determining the concentration of a gas or gases, comprising, in combination, means defining a measuring chamber; means for transporting test paper into said chamber; light source means for illuminating the test paper in said chamber; means for introducing into said chamber the gas or gases whose concentration is to be measured; light-detecting means operative for generating a signal indicative of the extent to which test paper in said measuring chamber undergoes coloration in response to exposure to the gas or gases; and means for generating an alarm signal when the time interval elapsing between introduction of fresh test paper into said chamber and the assumption by said signal of a preselected threshold value is less than a preselected time interval, including means for effecting transport of fresh test paper into said chamber in response to assumption by said signal of said preselected threshold value when the time interval elapsing between the previous introduction of fresh paper into said measuring chamber and the assumption by said signal of said preselected threshold value is longer than said preselected time interval.

4,023,931

MEANS AND METHOD FOR MEASURING LEVELS OF IONIC CONTAMINATION

Edgar W. Wolfgram, Glen Ellyn, Ill., assignor to Kenco Alloy & Chemical Co. Inc., Addison, Ill.

Filed Feb. 17, 1976, Ser. No. 658,182
Int. Cl.² G01N *27/06*
U.S. Cl. 23—230 R **11 Claims**



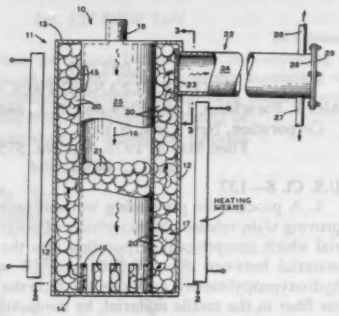
1. A method for measuring the ionic contamination of an electronic assembly including the steps of providing a test solution of a known ionic content, placing an electronic assembly of known exposed area into a predetermined static volume of the test solution, thereafter measuring the ionic content of the test solution to provide a measurement of the ionic contamination of said assembly.

4,023,932

REACTOR FOR ANALYSIS OF POLLUTED LIQUIDS

Alfred Cohen, 71 Joyce Lane, Woodbury, N.Y. 11797

Continuation-in-part of Ser. No. 179,964, Sept. 13, 1971, Pat. No. 3,854,881. This application Dec. 16, 1974, Ser. No. 533,247
Int. Cl.² B01J *8/02*; G01N *31/12, 33/18*
U.S. Cl. 23—253 PC **3 Claims**



1. A reactor which comprises a first housing, partition means disposed within said first housing to define therein an inner flow passage and an outer flow passage disposed in laterally surrounding relation to said inner flow passage and flow connected therewith, means defining an inlet in said first housing to accommodate the introduction therein of a liquid sample and a gas to be reacted with said sample, a packing material disposed in said inner flow passage to define therein an inlet plenum zone communicating with said inlet, and a packing material disposed in said outer flow passage, means defining an outlet in said first housing communicating with said outer flow passage, means operable to heat the packing material in said inner and outer flow passages to a temperature at which the sample is vaporized in said inlet plenum zone and the sample reacts with said gas while flowing therewith through said inner and outer passages in contact with the packing material, the gaseous and vapor reaction products of said sample and gas exiting the first housing through said outlet, said first housing having a cylindrical shell outer wall and a pair of plates connected each to a respective end of said outer wall, and said partition means including a cylindrical tubular inner wall extending between said plates and disposed in generally coaxial relation to said outer wall to define a cylindrical inner flow passage and an annular outer flow passage, the outlet of said first housing being through said outer wall, a second housing defining an outlet plenum chamber and connected at one end to said outer wall of the first housing for support thereby and communicating with said outlet thereof to receive said gaseous and vapor reaction products to cool same, said second housing having an outlet for the exits of such cooled reaction products as are not condensed to liquid, and separate outlet for drainage of such reaction products as are condensed to liquid, said second housing being inclined in a downward direction to facilitate drainage of such liquid.

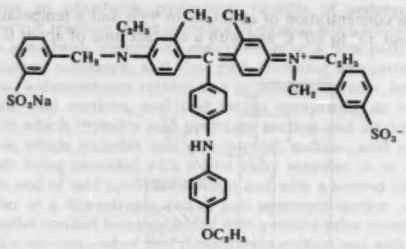
4,023,933

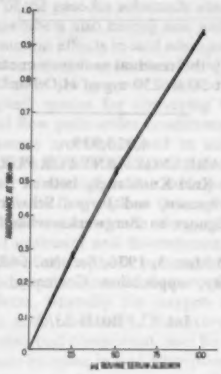
PROTEIN-ASSAY REAGENT AND METHOD

Marion M. Bradford, and William L. Williams, both of Athens, Ga., assignors to The University of Georgia, Athens, Ga.

Filed June 10, 1976, Ser. No. 694,668
Int. Cl.² G01N *33/16*
U.S. Cl. 23—230 B **23 Claims**

10. A method of assaying protein which comprises mixing a reagent comprising the dye





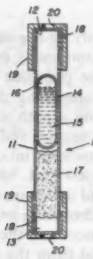
and an acid having a pKa of from 0 to 4 and a protein-containing sample and observing the resultant color change.

4,023,934

COLOR INDICATOR APPARATUS FOR PRESENCE OF OXYGEN

Ernest Elliott Spinner, Grandview, Mo., and Melvin Wayne Hounsell, Beloit, Wis., assignors to Marion Laboratories, Inc., Kansas City, Mo.

Filed Dec. 22, 1975, Ser. No. 643,331
Int. Cl.² G01N *31/22*
U.S. Cl. 23—254 R **2 Claims**



1. A color indicator apparatus for determining the presence of oxygen which comprises:

a flexible polymeric tube open at both ends,

an ampoule in and in contact with the tube, said ampoule containing a redox color indicator liquid,

an absorbent material, for the liquid in the ampoule, in the tube, and

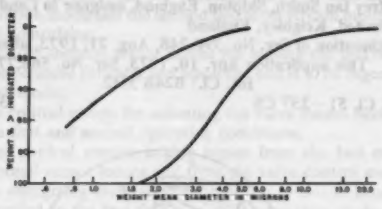
a gas permeable, liquid impervious, bacteriological filter at each end of the tube.

4,023,935

METHOD OF MAKING FINELY PARTICULATE AMMONIUM PERCHLORATE

Michael L. Levinthal; Gale F. Allred, both of Brigham City, and Larry W. Poulter, Ogden, all of Utah, assignors to Thiokol Corporation, Newtown, Pa.

Filed Sept. 15, 1971, Ser. No. 180,741
Int. Cl. C01c *1/00*
U.S. Cl. 23—302 A **7 Claims**



1. The method of making ultra-fine particle size ammonium perchlorate which comprises establishing a two-phase liquid system comprising upper and lower liquid phases that are substantially immiscible with each other, the upper phase of said system being a solution of ammonium perchlorate and the lower phase of said system being a liquid in which ammonium perchlorate is substantially insoluble, subjecting said system to ultra-sonic vibrations and simultaneously precipitating ammonium perchlorate particles from said upper phase by cooling said upper phase or vaporizing the liquid thereof to cause fine ammonium perchlorate particles to collect in said lower phase liquid, separating said lower phase liquid from said upper phase liquid, and vaporizing the liquid of said lower phase to recover said ammonium perchlorate particles therefrom.

4,023,936

TITANIUM CLAD STEEL AND PROCESS FOR MAKING

Stephen Lewis Morse, Downingtown, and James J. McGlynn, Paoli, both of Pa., assignors to Lukens Steel Company, Coatesville, Pa.

Filed June 14, 1976, Ser. No. 695,372
Int. Cl.² B32B *15/18*; B23K *31/02*
U.S. Cl. 428—679 **9 Claims**

1. A method for producing a titanium clad steel which comprises the steps of providing:

a first plate of carbon steel;

providing a second plate of nickel containing nor more than 0.03% carbon and not less than about 0.05% of a carbide former which where higher than said minimum of 0.05% is in a ratio of about 4–35 of carbide former to 1 of carbon;

providing a third plate of titanium and sandwiching said second plate in a face-to-face contact between said first and third plates into an assembly, hermetically sealing at least second plate within said assembly, heating said assembly to a temperature of about 1650° – 1700° F., and rolling said assembly at said temperature sufficiently to produce a metallurgical bond between said plates which is characterized by a high relative ductility whereby specimens rolled to ½ inch gauge in the as-rolled condition may be bent with the titanium in compression or tension or both in side bends without bond cracking or separation to a one-half inch interior diameter and 180°.

5. A titanium clad steel which is comprised of three layers which are metallurgically bonded together by rolling at a temperature of about 1650° to 1700° F., said three layers consisting essentially of a first layer of steel, a second layer of nickel and a third layer of titanium, said nickel layer containing not more than 0.03% carbon and not less than about 0.05% of a carbide former which where it is higher than said minimum of said 0.05% is in ratio of about 4–35 of carbide former to 1 of carbon, said titanium clad steel being character-

ized by high relative ductility whereby specimens rolled to ½ inch gauge in the as-rolled condition may be bent with the titanium in compression or tension or both in side bends without bond cracking or separation to a one-half inch interior diameter and 180°.

4,023,937

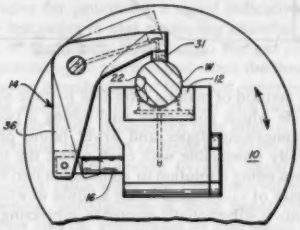
CHUCK ASSEMBLY

Geofrey Ian Smith, Skipton, England, assignor to Landis Lund Limited, Keighley, England

Continuation of Ser. No. 390,248, Aug. 21, 1973, abandoned. This application Apr. 10, 1973, Ser. No. 566,773

Int. Cl.² B24B *5/42*

U.S. Cl. 51—237 CS **3 Claims**



1. A chuck assembly for rotatably supporting a bearing of a workpiece comprising a clamping fixture including

a throw block having a bearing surface selectively configured for matingly supporting a first portion of the workpiece bearing,

a jaw having a selectively configured bearing surface for matingly engaging another portion of the workpiece bearing when a workpiece bearing is clamped between said throw block and said jaw,

means for displacing said jaw prior to a machining operation from a retracted position spaced from said another portion to a clamping position, and

means for urging the workpiece bearing, matingly supported by said throw block bearing surface away therefrom including,

at least one air pocket in said throw block bearing surface,

a source of pressurized air, and

means for directing pressurized air from said source to a closed volume which is defined by said air pocket and the first workpiece bearing portion when said jaw is displaced to said retracted position, whereby the force required to displace the workpiece relative to said throw block and said jaw will be reduced.

4,023,938

PROCESS FOR DEHYDRATING GAS WITH SULFURIC ACID

Hans Guth, Bergisch-Neukirchen; Gerhard Jonas; Klaus Kleine-Weischede, both of Leverkusen; Hermann Wieschen, Cologne; Hans-Joachim Kaiser, Leverkusen; Karl-Heinz Dorr, and Hugo Grimm, both of Frankfurt, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen and Metallgesellschaft Aktiengesellschaft, Frankfurt, both of, Germany

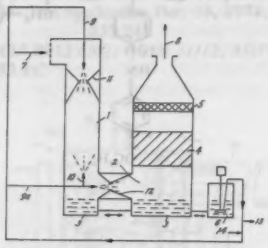
Continuation-in-part of Ser. No. 514,874, Oct. 15, 1974, abandoned. This application Apr. 15, 1975, Ser. No. 568,341

Claims priority, application Germany, Oct. 17, 1973, 2352039; Mar. 8, 1975, 2510241

Int. Cl.² B01D *53/14*

U.S. Cl. 55—30 **13 Claims**

1. In the removal of water from a gas containing about 5 to 30 g of water per Nm^3 by contact with sulfuric acid, the improvement which comprises supplying the sulfuric acid in finely divided form having a surface of about 10^4 to 10^7 m^2/h at a concentration of about 95 to 99% and a temperature of about 35° to 80° C and with a contact time of about 0.2 to 2



seconds, whereby the residual moisture content of the gas is reduced to about 30 to 250 mg of H_2O/Nm^3.

4,023,939

METHOD AND ARRANGEMENT FOR PURIFYING GASES

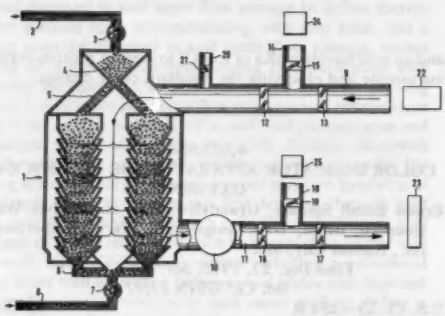
Harald Jüntgen; Karl Knoblauch, both of Essen; Horst Grochowski, Oberhausen, and Jurgen Schwarte, Essen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

Filed Mar. 3, 1976, Ser. No. 663,262

Claims priority, application Germany, Mar. 5, 1975, 2509476

Int. Cl.² B01D *53/06*

U.S. Cl. 55—73 **13 Claims**



1. A method of purifying a gaseous substance which contains an adsorbable component capable of undergoing exothermic reaction in the presence of oxygen when adsorbed upon an adsorbent, comprising conveying a stream of said gaseous substance along a path which includes an upstream section, a downstream section and an adsorption zone for the adsorption of said component intermediate said sections, said conveying being carried out while maintaining subatmospheric pressures in said upstream and downstream sections of said path and in said adsorption zone; interrupting said stream of said gaseous substance; and thereafter forcibly admitting a quantity of gas selected from the group consisting of air and inert gases into each of said upstream and downstream sections of said path so as to raise the pressures in said sections of said path at least to the order of atmospheric pressure, said raising of the pressures being effective for restricting the entry into said adsorption zone of air currents due to leakage and suction effects so that the oxygen available in said adsorption zone and, resultantly, the extent of said exothermic reaction, are restricted and an undue temperature increase in said adsorption zone due to said exothermic reaction may be prevented.

9. An arrangement for purifying a gaseous substance which

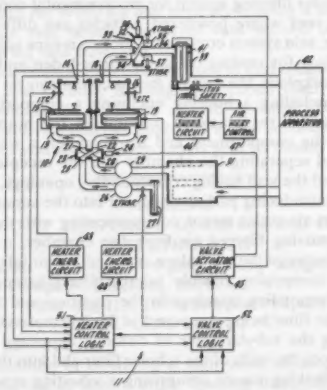
contains an adsorbable component capable of undergoing exothermic reaction in the presence of oxygen when adsorbed on an adsorbent, comprising means defining a flow path for the gaseous substance, said flow path including an upstream section, a downstream section and an adsorption zone intermediate said sections, and said means comprising an inlet conduit which includes said upstream section and an outlet conduit which includes said downstream section, said inlet conduit being provided with a first valve member at an upstream end of said upstream section and with a second valve member at a downstream end of said upstream section, and said outlet conduit being provided with another valve member at a downstream end of said downstream section and with an additional valve member at an upstream end of said downstream section, said valve members having open positions for permitting flow of the gaseous substance along said flow path, and said valve members also having non-gastight closed positions to permit suction effects in said adsorption zone and said upstream and downstream sections of said flow path to be reduced when flow of the gaseous substance along said flow path is interrupted; means for conveying the gaseous substance along said flow path under conditions such that subatmospheric pressures are maintained in said upstream and downstream sections thereof and in said adsorption zone; and means for forcibly admitting gas into said upstream and downstream sections of said flow path so that, upon interruption of the flow of the gaseous substance along said flow path, the pressures in said upstream and downstream sections may be raised to the order of atmospheric pressure so as to restrict the entry into said adsorption zone of air currents due to leakage and suction effects, whereby the oxygen available in said adsorption zone and, resultantly, the extent of exothermic reaction of the adsorbed component, may be restricted and an undue temperature increase in said adsorption zone due to the exothermic reaction may be prevented, said admitting means including first admitting means arranged to admit gas into said inlet conduit intermediate said first and second valve members, and said admitting means including second admitting means arranged to admit gas into said outlet conduit intermediate said other and additional valve members.

4,023,940

REGENERATION CYCLE CONTROL FOR INDUSTRIAL AIR DRYER

Gilbert F. Shultz, Novi, Mich., assignor to Whitlock, Inc., Farmington, Mich.

Filed July 2, 1975, Ser. No. 592,375
Int. Cl.² B01D *53/04*
U.S. Cl. 55—163 **8 Claims**



1. A control for a gas dryer of the kind comprising first and second dessicant beds each having an inlet and an outlet, regeneration heater means for heating gas supplied to the respective bed inlets, and valve means, connected to the bed inlets and the bed outlets, actuatable between alternate operating conditions including a first operating condition, in which the first bed is in an on-stream mode with its outlet connected to a process apparatus gas intake and its inlet connect to the exhaust of the process apparatus and the second bed is in a regeneration mode with its outlet diverted from the process apparatus and its inlet connected to a regeneration air supply, and a second operating condition in which the inlet and outlet connections of the beds are reversed with the first bed in regeneration mode and the second bed in on-stream mode, the control comprising:

bed outlet thermal sensor means for sensing the bed outlet temperature for each bed when the bed is in its regeneration mode;

valve control means for actuating the valve means between the first and second operating conditions;

heater control means, having inputs from the bed outlet thermal sensor means and from the valve control means, for energizing the regeneration heater means to heat gas supplied to the bed that is in its regeneration mode, following the initiation of an operating cycle, until the outlet temperature of that bed increases to a first temperature limit T1, and then de-energizing that regeneration heater means;

the valve control means having inputs from the bed outlet thermal sensor means and from the heater control means, for actuating the valve means to its alternate operating condition to initiate a new cycle, following de-energization of the regeneration heater, when the bed outlet temperature reduces to a second temperature limit T2, where T1 > T2;

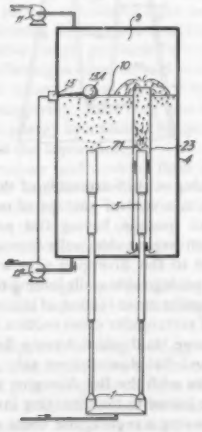
and a regeneration air thermal sensor, for sensing the temperature of the regeneration air supply, coupled to the valve control means to modify the second temperature limit T2 in response to variations in the regeneration air supply.

4,023,941

GAS DESORPTION FROM LIQUIDS

Donald Stuart Miller, Olney, England, assignor to The British Hydromechanics Research Association, United Kingdom

Continuation-in-part of Ser. No. 462,854, April 22, 1974, abandoned. This application Jan. 28, 1976, Ser. No. 653,034
Int. Cl.² B01D *19/00*
U.S. Cl. 55—169 **7 Claims**



1. Gas desorption apparatus for desorbing gas from a liquid, comprising, in combination, a stepped desorption tube extending upwardly, having an inlet end and an outlet end for

the liquid respectively at the bottom and top of the tube, the tube comprising several elongated sections each having a different cross-sectional area, so that the cross-sectional area of the desorption tube increases stepwise upwardly along its length with the outlet end being of greater cross-sectional area than the inlet end; a nozzle opening into the inlet end of the desorption tube; pump means for pressurizing the liquid ahead of the nozzle, the nozzle serving to direct the pressurized liquid axially into the desorption tube in the form of a jet; deflector means interposed immediately ahead of the nozzle for imparting a helical motion to the liquid, so that upon entering each section of the tube, the jet diverges into contact with the inner wall of such section thereby to define and to seal a totally enclosed annular space of reduced pressure between the jet and said section of the desorption tube to encourage the gas in the liquid to emerge therefrom in the form of entrained bubbles; a receptacle enclosing the outlet end of the desorption tube for receiving liquid from the desorption tube; and means for maintaining the level of liquid in the receptacle below the top of the receptacle yet adequate to keep the output end of the desorption tube submerged so that the liquid has a free surface disposed above the outlet end of the desorption tube for freeing of bubbles of gas into the space above the free surface of the liquid.

4,023,942

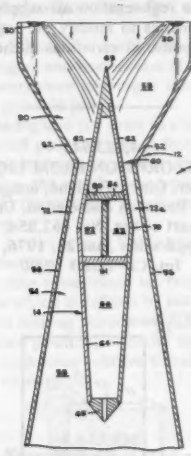
VARIABLE THROAT VENTURI SCRUBBER

Jack D. Brady, and Lester K. Legatski, both of San Jose, Calif., assignors to FMC Corporation, San Jose, Calif.

Continuation of Ser. No. 257,522, May 30, 1972, abandoned. This application Jan. 22, 1975, Ser. No. 543,088

Int. Cl.² B01D *47/10*

U.S. Cl. 55—241 **4 Claims**



4. In a gas scrubbing venturi assembly of the type comprising a gas conduit with a venturi passage of rectangular cross section, said venturi passage having flat parallel sidewalls connected to flat converging side walls forming an inlet passage and connected to flat diverging side walls forming an outlet passage, said passage side walls joining to form a restriction having a rectangular cross section of minimum width, and a gas guide insert of rectangular cross section axially centered in said venturi passage, said insert having flat diverging upstream side walls and flat downstream side walls that form interior obtuse angles with the flat diverging side walls of the insert and which are joined to the diverging insert side walls to form a restriction having a rectangular cross section of maximum width that is normally downstream of said venturi passage restriction, said insert side walls bridging the flat edge walls of said venturi passage for confining gas flow between the side walls of the venturi passage and of the insert, and means for introducing a scrubbing liquid into said venturi inlet passage; the improvement wherein said assembly comprises a single venturi passage and a single insert, the width of the restriction of said venturi passage and the maximum width of said insert being substantially equal, the angle of divergence of said diverging venturi outlet passage side walls equaling the angle of divergence of said diverging insert side walls, said insert being positioned in said venturi passage so that said diverging insert side walls extend a substantial distance in the direction of gas flow from the minimum width cross section restriction of said venturi passage, the diverging walls of said insert cooperating with the diverging walls of said venturi outlet passage to form two relatively diverging scrubbing throats, each of said throats being of constant cross sectional area along its length, said scrubbing throats being followed by two gradually enlarging exit throats formed by the diverging side walls of said venturi outlet passage and the downstream side walls of said insert, and means for axially adjusting the position of said insert in the venturi passage.

4,023,943

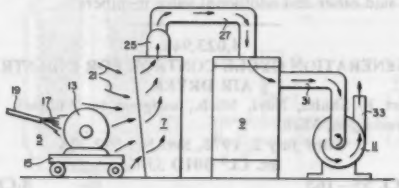
FILTER SYSTEM

Harry P. Kipple, Pittsburgh; Roger J. Alke, Wexford; John R. Coppage, Pittsburgh; Charles E. Price, Pittsburgh, and Brian J. Sturman, Jr., Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 8, 1976, Ser. No. 665,135

Int. Cl.² B01D *46/04*

U.S. Cl. 55—304 **4 Claims**

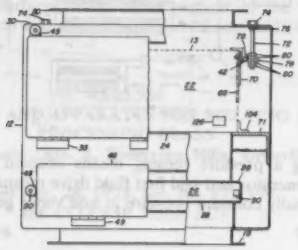


1. A powder filtering system for environmental control at a workplace vent where powdered particles are diffused into ambient air, said system comprising suction means adjacent to the workplace for venting off any particle-laden ambient air from the workplace, the suction means comprising an air filter structure including a housing enclosing a compartment, a chamber, and a receptacle, a partition in the housing and separating the compartment and the chamber, a wall in the housing and separating the chamber and the receptacle, the partition and the wall having corresponding openings, air inlet means for introducing particle-laden air into the compartment and exhaust air outlet means communicating with the chamber for removing filtered air from the chamber, a conduit extending between the workplace vent and the air inlet, the air filter also comprising flexible tubular filters extending between corresponding openings in the partition and the wall, each tubular filter being composed of flexible material, means for shaking the tubular filter to dislodge deposited powder particles from the walls of the tubular filter and into the receptacle, the shaking means comprising a vibrating structure, a rigid frame within the chamber and around the tubular filters, and spaced rods extending across the frame and between the filters, and each tubular filter being separately attached to one of the spaced rods.

4,023,944
FILTER UNIT

Bennie J. Beane, Wilmington, N.C., assignor to General Electric Company, San Jose, Calif.

Filed Apr. 22, 1976, Ser. No. 679,209
Int. Cl.² B01D 46/00
U.S. Cl. 55—481 19 Claims



1. A filter unit adapted for receiving a flow of fluid and for holding filters transverse to said flow, comprising in combination,

a. a housing having a fluid inlet opening and a fluid outlet opening in two opposite end surfaces for passage of said flow of fluid therethrough, said housing having in its lateral surfaces a first opening and a second opening,

b. a first door means being movably mounted to said housing at one edge of said first opening and closing said first opening when said first door is in its closed position,

c. first clamping means being attached to said housing and being adapted to engage and secure said first door means as closed over said first opening,

d. a second door means being movably mounted to said housing at one edge of said second opening and closing said second opening when said second door is in its closed position, said second door means including a filter change platform mounted inside said door with two apertures therein adapted to receive indexing studs,

e. second clamping means being attached to said housing and being adapted to engage and secure said second door means as closed over said second opening,

f. means for receiving and securely holding a first filter inside said housing adjacent said first opening for filtering said flow,

g. means for receiving and securely holding a second filter inside said housing adjacent said second opening for filtering said flow, and

h. two indexing studs being affixed to said means for receiving and securely holding said second filter, said studs extending through said second opening and engaging respectively said two apertures in said second door means when said second door means is in its closed position.

4,023,945
METHOD OF TEMPERING GLASS HAVING OPENINGS THERETHROUGH

Premakaran T. Boaz, Southgate, Mich., assignor to Ford Motor Company, Dearborn, Mich.

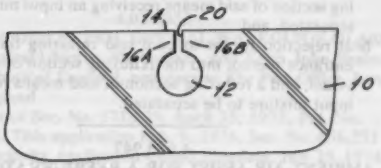
Filed Aug. 13, 1976, Ser. No. 714,435
Int. Cl.² C03B 21/00, 27/00
U.S. Cl. 65—112 7 Claims

1. A method of obtaining a high yield of tempered glass articles having at least a single opening therethrough which comprises the steps of:

cutting the shape of the article to be formed from a glass sheet;

cutting an opening in the glass sheet, said opening being surrounded by the glass sheet;

cutting a relief opening in the glass sheet from the opening in the glass sheet to an edge of the glass sheet; and

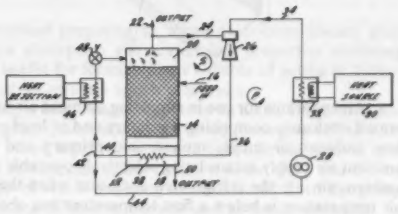


tempering the glass sheet having the opening and relief opening therein.

4,023,946
RECTIFICATION SYSTEM FOR THE SEPARATION OF FLUIDS

Everett H. Schwartzman, 724 Cloyden Road, Palos Verdes Estates, Calif. 90274

Continuation-in-part of Ser. No. 414,600, Nov. 9, 1973, Pat. No. 3,869,351. This application Feb. 27, 1975, Ser. No. 553,538
The portion of the term of this patent subsequent to Mar. 4, 1992, has been disclaimed.
Int. Cl.² F25J 1/02
U.S. Cl. 62—40 14 Claims



1. A combined power loop and rectification type separation system for the separation of multicomponent mixtures by heat energy comprising:

means comprising at least one vessel receiving an input mixture to be separated by liquid and vapor phase equilibrium phenomenon,

said vessel including a lower portion forming a reboiler section containing a liquid and an upper portion forming a refluxing section containing a gas and a portion therebetween containing liquid-gas contacting means,

means to remove output products from said reboiler section and said refluxing section of said vessel,

working fluid means in heat transfer relationship with said vessel for supplying, adsorbing and transporting the required heat energy by a phase change of the working fluid to carry out the separation,

means to introduce said working fluid in gaseous form into said reboiler section to effect condensation of said gas thereby producing heat to vaporize at least a portion of the liquid to the reboiler section,

means to remove condensed working fluid from the reboiler section,

means receiving at least a portion of the condensed working fluid from said reboiler section and to pressurize the same,

means receiving and heating said pressurized condensed working fluid in liquid form to convert said working fluid from liquid form to gaseous form thereby to provide a power source for compressor means,

compressor means receiving said power source working fluid and working fluid in gaseous form from the refluxing section of said vessel to provide a compressor output working fluid in gaseous form for flow into said reboiler section of said vessel for condensation thereof to liquid form,

means receiving at least a portion of the condensed working fluid from said reboiler section to provide refluxing fluid to the refluxing section of one of said vessel and a refluxing section of said means receiving an input mixture to be separated, and

heat rejection means to cool said refluxing fluid prior to entrance thereof into the refluxing section of one of said vessel, and a refluxing section of said means receiving an input mixture to be separated.

4,023,947

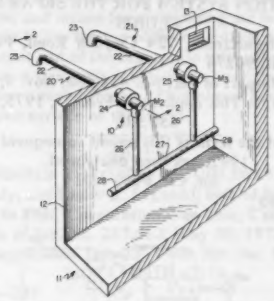
AMBIENT AIR ASSIST FOR A REFRIGERATOR UNIT

Everett B. Ferry, P.O. Box 382, Montpelier, Vt. 05602

Filed Jan. 27, 1976, Ser. No. 652,926

Int. Cl.² F25D *14/08*

U.S. Cl. 62—180 **7 Claims**



1. An apparatus for use in supplying ambient air to a refrigerated enclosure comprising a primary and at least one auxiliary ambient air supply means, said primary and auxiliary ambient air supply means being selectively operable to supply ambient air into the refrigerated enclosure when the ambient air temperature is below a first temperature but above a second temperature, said auxiliary ambient air supply means being operably disconnected from said primary ambient air supply means to stop the supply of ambient air therethrough into the refrigerated enclosure when the ambient air temperature is below the second temperature, whereby the rate of flow of ambient air into the refrigerated enclosure is reduced as said auxiliary ambient air supply means is disconnected in response to colder ambient air temperatures.

4,023,948

SOLAR ENERGY REFRIGERATION AND AIR CONDITIONING SYSTEM

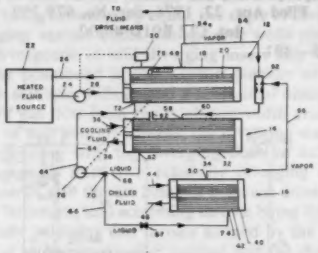
Clyde T. Pitts, 13608 Donward Court, Tampa, Fla. 33612; Herbert A. Ingley, 5009 NW. 34th Terrace, Gainesville, Fla. 32605; Erich A. Farber, 1218 NE. 5th St., Gainesville, Fla. 32601, and Clayton A. Morrison, 2716 NW. 4th Ave., Gainesville, Fla. 32601

Filed May 27, 1975, Ser. No. 580,675

Int. Cl.² F25B *1/06*

U.S. Cl. 62—191 **8 Claims**

1. An air conditioning system for cooling an enclosed area comprising a vapor generator operatively coupled to an externally disposed heated fluid source, said heated fluid source being coupled to said vapor generator through a first fluid drive means to supply heated fluid to said vapor generator, a condenser operatively coupled to the output of said vapor generator through an ejector means, said condenser coupled to the input of said vapor generator by a second fluid drive means to return condensed refrigerant from said condenser to said vapor generator, and an evaporator for chilling fluid for air conditioning the enclosed area, the output of said evaporator coupled to said condenser through said ejector means to return vaporized refrigerant from said evaporator to said condenser and the output of said condenser being coupled to the input of said evaporator to feed condensed refrigerant from said condenser to said evaporator, said system further



including a pressure sensing means coupled between said vapor generator and said first fluid drive means to maintain a substantially constant pressure in said vapor generator.

4,023,949

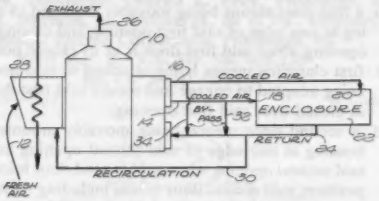
EVAPORATIVE REFRIGERATION SYSTEM

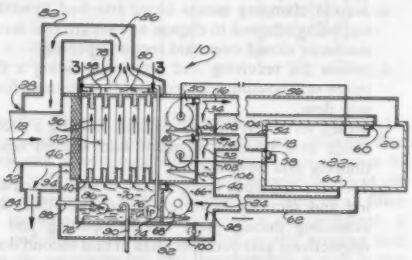
Leslie A. Schlom, 5524 Saloma Ave.; Michael B. Dubey, 5518 Saloma Ave., both of Van Nuys, Calif. 91411, and Andrew J. Becwar, 818 Old Landmark Lane, La Canada, Calif. 91011

Filed Aug. 4, 1975, Ser. No. 601,873

Int. Cl.² F25D *17/04;* **F28D** *5/00*

U.S. Cl. 62—309 **18 Claims**





1. An evaporative refrigeration system for supplying cooled fresh air for delivery to an enclosure, and utilizing air returned therefrom as a working fluid, comprising:

heat exchange walls having opposite first and second exposed surfaces;

liquid discharge means arranged to apply a vaporizable liquid to flow across said first surfaces to wet said first surfaces whereby to provide an extended film of said vaporizable liquid thereon;

return means for flowing return air from said enclosure over said first exposed surfaces, countercurrently to flow of said vaporizable liquid as at least the majority of air flowing over said first surfaces, to evaporate said liquid from said first surfaces to thereby abstract heat from said walls to cool thereby said second surfaces and moisten said

return air, and discharging said moistened return air to a position outside of said enclosure.

means for flowing fresh air from outside said enclosure into thermal conductive contact with said cooled second exposed surfaces, as the majority of air flowing into said contact, to cool said fresh air;

means for conducting at least a portion of said cooled air to said enclosure; and

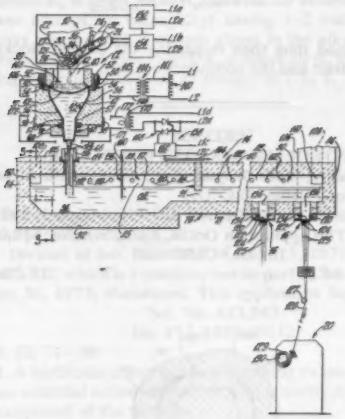
means for flowing a portion of return air from said enclosure into thermal conductive contact with said second exposed surfaces, as a minor amount of the total air flowing into said contact, and thence into said enclosure.

4,023,950

METHOD AND APPARATUS FOR MELTING AND PROCESSING GLASS

Hellmut I. Glaser, Rte. 2, Evergreen Hills, Granville, Ohio 43023

Filed Apr. 28, 1975, Ser. No. 572,359
Int. Cl.² C03B *37/02, 5/24*
U.S. Cl. 65—29 **7 Claims**



1. The method of processing glass including feeding particulate glass batch into a melter, melting the glass batch in the melter, flowing molten glass from the melter into a distributor below the melter, refining the glass in the distributor, flowing streams of the refined glass from the distributor, sensing the relative position of the surface of the glass batch in the melter, and regulating the rate of feeding of the glass batch into the melter responsive to the sensed relative position of the surface of the glass batch.

4,023,951

TREATMENT OF GLASS

Bryan Shaw, and Neil Winterton, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 25, 1975, Ser. No. 607,544
Claims priority, application United Kingdom, Sept. 25, 1974, 41686/74; Aug. 4, 1975, 32486/75
Int. Cl.² C03C *17/00*
U.S. Cl. 65—30 R **10 Claims**

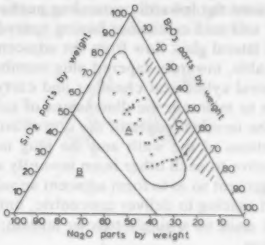
1. A process for the strengthening of a phosphate glass which contains at least 50 mole % P_2O_5, which process comprises contacting a surface of a phosphate glass with a solution of 0.05 to 1.0 mole per liter of a carboxylic acid in a liquid diluent at a temperature in the range of 0° to 100° C, the solution having a pH in the range 4 to 12, the carboxylic acid comprising an amino-carboxylic acid, or a hydroxy-carboxylic acid, or a mixture of an amino-carboxylic acid and a hydroxy-carboxylic acid.

4,023,952

MAKING A DIELECTRIC OPTICAL WAVEGUIDE GLASS

George Reginald Newns, Hintlesham, and Keith John Beales, Henley, both of England, assignors to The Post Office, London, England

Division of Ser. No. 571,529, April 25, 1975, Pat. No. 3,957,342. This application Feb. 9, 1976, Ser. No. 656,271
Claims priority, application United Kingdom, July 29, 1974, 33484/74; Dec. 9, 1974, 53097/74; Jan. 24, 1975, 03306/75
Int. Cl.² C03B *23/14*
U.S. Cl. 65—32 **10 Claims**



9. A method preparing an alkali oxide-boro-silicate glass having low absorption and scatter loss properties rendering the glass useful for forming fibers capable of acting as dielectric optical waveguides which comprises:

providing a batch material to form an alkali oxide-boro-silicate glass system and lying outside the region (C) of FIG. 1 of phase separation of soda-boro-silicate glasses, said glass system containing between about 0.01 and 5% by weight of redox buffering oxide selected from the group consisting of arsenic trioxide and antimony trioxide,

melting said batch material at a glass forming temperature between about 800° to 1400° C,

bubbling a mixture of carbon dioxide and carbon monoxide containing up to 20% carbon monoxide through the molten glass, and

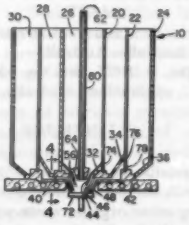
fining the molten glass after cessation of said gas bubbling.

4,023,953

APPARATUS AND METHOD FOR PRODUCING COMPOSITE GLASS TUBING

John E. Megles, Jr., and Timothy W. Richardson, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Aug. 7, 1975, Ser. No. 602,649
Int. Cl.² C03B *15/14*
U.S. Cl. 65—86 **5 Claims**



1. Apparatus for forming concentric glass tubing having at least three layers directly from separate sources of molten

vitreous material while avoiding exposure of such separate sources to detrimental gaseous media during the formation of such tubing, said glass layers being selected such that each has a different composition from that of an adjacent layer, which comprises a molten glass feeder assembly resting upon a refractory base having an annular orifice therein, said assembly consisting of a flow-through refractory container having concentric cylindrical walls of increasing diameter which define at least three sources of molten vitreous material, an inner wall defining a central cylindrical chamber and each adjacent pair of walls defining an annular chamber of substantially uniform diameter, each wall having an inwardly and downwardly extending projection terminating in a section which extends generally downwardly with an inward component into said annular orifice in said refractory base to define an opening of reduced size at its terminus, the inner walls having extensions which bear against the inwardly extending portion of the next adjoining wall and said extensions having spaced openings to permit inward lateral glass flow from the adjacent chamber, a vertically movable, inwardly-tapered plug member positioned within the central cylindrical chamber and carrying a source of air pressure to maintain the dimensions of said concentric glass tubing, the terminal edges of the downwardly extending bottom projections of the walls and the plug member being positioned relative to each other in an inwardly and upwardly stepped arrangement so as to form adjacent annular orifices of predetermined spacing to deliver concentric, uniform streams of glass which unite in a single tubular stream as they issue from the orifices.

3. A method for making glass tubing composed of at least three layers comprising the steps of:

a. forming a central reservoir of molten glass in cylindrical relationship around a blow tube for the introduction of air under pressure;

b. forming at least two additional reservoirs of molten glass in cylindrical, concentric relationship with said central reservoir, the glass compositions in said central reservoir and said additional reservoirs being selected such that each has a different composition from that in an adjacent reservoir;

c. thermally adjusting the viscosity relationship of the molten glasses in the said reservoirs to provide a desired flow of each;

d. simultaneously flowing a stream of molten glass through an annular orifice in each reservoir, said streams having concentric uniform glass flows;

e. joining the annular streams issuing from said orifices while air under pressure is introduced through said blow tube to form, and maintain a desired diameter in, a composite glass tube composed of at least three layers wherein the interface between adjacent pairs of glass layers is free from inclusions or defects.

4,023,954
METHOD OF PRODUCING HIGH PROTEIN FERTILIZERS AND BIRD AND STOCK FEED FROM WASTE

Christian Fayd'Herbe de Maudave, Lawnbrook Road, Bickley Valley, Western Australia, Australia

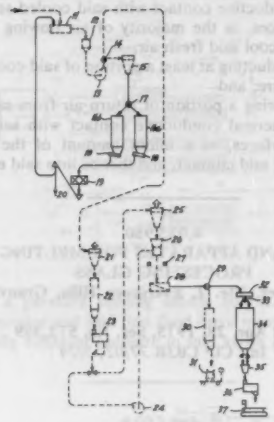
Filed Dec. 9, 1975, Ser. No. 639,109

Claims priority, application Australia, Dec. 12, 1974, 9988/74

Int. Cl.² C05F *3/00*

U.S. Cl. 71—15 **9 Claims**

1. A method of producing fertilizer comprising the steps of taking manure which comprises numerous species of predatory beetles, mixing other organic waste with said manure to form a stockpile and allowing the stockpile to stand for a predetermined time to allow said beetles to work on said manure to break down organic matter, feeding said stockpile through a crusher into a drier, subjecting the dried matter to a secondary crusher, conveying the finely crushed material to a second stockpile, allowing said second stockpile to stand for



a predetermined time then re-passing the second stockpile through the drier and the secondary crusher.

4,023,955
CONTROLLED RELEASE FERTILIZER

Otto H. Mueller, Fort Wayne, Ind., assignor to General Portland, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 337,456, March 2, 1973, abandoned. This application Oct. 4, 1974, Ser. No. 512,090

Int. Cl.² C05C *9/00*

U.S. Cl. 71—64 F **15 Claims**

1. A solid controlled release fertilizer comprising a discrete particle of fertilizer material having:

a. a substantially uniform first coating of a cement partially hydrated with up to about 30 weight percent water;

b. a substantially uniform second coating around said first coating of a thin semipermeable elastomer; and

c. a substantially uniform third coating around said second coating of a partially hydrated homogeneous cement-fertilizer mixer containing thoroughly dispersed therein micronutrient trace elements.

4,023,956
AMIDE PHOSPHOROTHIOLATE HERBICIDES

Ryo Yoshida, Minoo; Takeo Satomi; Kunio Mukai, both of Nishinomiya, and Masachika Hirano, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

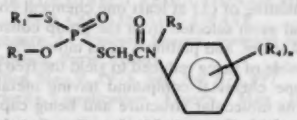
Filed Sept. 9, 1975, Ser. No. 611,606

Claims priority, application Japan, Sept. 24, 1974, 49-110264

Int. Cl.² A01N *9/36*; C07F *9/165*

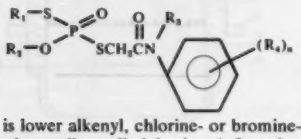
U.S. Cl. 71—87 **8 Claims**

1. A compound of the formula



wherein R_1 is lower alkenyl, chlorine- or bromine-substituted lower alkenyl, or alkoxyalkyl having 1–2 carbon atoms in the alkoxy group and 1–3 carbon atoms in the alkyl group, R_2 is lower alkyl, R_3 is lower alkyl, R_4 is lower alkyl, lower alkoxy or halogen, and n is zero or an integer of 1 to 5.

8. A method of killing weeds which comprises applying to the locus to be treated a herbicidally effective amount of a compound of the formula



wherein R_1 is lower alkenyl, chlorine- or bromine-substituted lower alkenyl, or alkoxyalkyl having 1–2 carbon atoms in alkoxy group and 1–3 carbon atoms in the alkyl group, R_2 is lower alkyl, R_3 is lower alkyl, R_4 is lower alkyl, lower alkoxy or halogen, and n is zero or an integer of 1 to 5.

4,023,957

HERBICIDAL 1-THIADIAZOLYL-5-CARBAMOYLOXYIMIDAZOLIDINONES

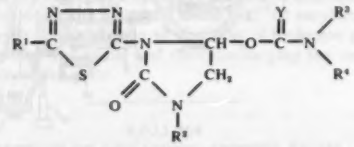
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 442,934, Feb. 15, 1974, Pat. No. 3,925,402, which is a continuation-in-part of Ser. No. 428,272, Dec. 26, 1973, abandoned. This application Sept. 10, 1975, Ser. No. 611,947

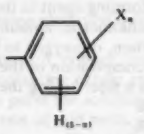
Int. Cl.² A01N 9/142

U.S. Cl. 71—90 **2 Claims**

1. A herbicidal composition comprising an inert carrier, and as an essential active ingredient, in a quantity toxic to weeds, a compound of the formula



wherein R_1 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; R^2 is lower alkyl; R^3 is selected from the group consisting of hydrogen and lower alkyl; Y is selected from the group consisting of oxygen and sulfur; and R^4 is selected from the group consisting of hydrogen, lower alkyl, cycloalkyl of from 3 to 7 carbon atoms and



wherein X is selected from the group consisting of lower alkyl, halogen, lower haloalkyl and lower alkoxy, and *n* is an integer from 0 to 3.

4,023,958

HALOGENATED 4-TRIFLUOROMETHYL-DIPHENYL-ETHER COMPOUNDS AND HERBICIDAL COMPOSITIONS

Lothar Rohe, Wuppertal; Jürgen Schramm, Dormagen; Erich Klauke, Odenthal-Hahnenberg; Ludwig Eue, and Robert Rudolf Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

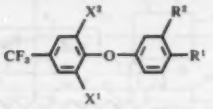
Division of Ser. No. 483,331, June 26, 1974, Pat. No. 3,957,865. This application Feb. 27, 1976, Ser. No. 662,067

Claims priority, application Germany, July 3, 1973, 2333848

Int. Cl.² A01N 9/14

U.S. Cl. 71—103 **17 Claims**

1. Method of combating undesired vegetation, which method comprises applying to such vegetation or its habitat herbicidally effective amounts of a halogenated 4-trifluoromethyldiphenyl-ether compound of the formula



(I)

in which

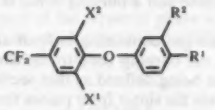
R^1 is alkylsulfinyl or alkylsulfonyl of from 1 to 4 carbon atoms;

R^2 is hydrogen or methyl;

X^1 is halogen; and

X^2 is hydrogen or halogen.

7. Halogenated 4-trifluoromethyldiphenyl ether compound of the formula



(I)

in which

R^1 is alkylsulfinyl or alkylsulfonyl of from 1 to 4 carbon atoms;

R^2 is hydrogen or methyl;

X^1 is halogen; and

X^2 is hydrogen or halogen.

4,023,959

METHOD FOR RECOVERING VANADIUM FROM MAGNETITE AND FORMING A MAGNETITE PRODUCT LOW IN SODIUM AND SILICA

Arnold Earl Nilsen, Freehold, N.J., assignor to NL Industries, Inc., New York, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,716

Int. Cl.² C22B 1/00

U.S. Cl. 75—1 R **11 Claims**

1. Process for recovering vanadium from magnetite and producing a magnetite end product suitable for use as feed material for blast furnaces in the production of metallic iron comprising: preparing a finely divided magnetite concentrate consisting essentially of iron oxide as Fe_3O_4, titanium dioxide and minor amounts of silicious materials and vanadium, screening said magnetite concentrate on +250 to +270 screens thereby separating a finely divided magnetite fraction from a coarser silicious fraction, admixing a sodium compound with said screened, finely divided magnetite fraction, said sodium compound added in amount equivalent to 0.43–0.75% sodium on magnetite weight basis, roasting the mixture at temperature in the range from 1000° to 1300° C. for from 1 to 2 hours to convert the vanadium values in said magnetite to a water soluble sodiumvanadium compound, and

leaching the roasted magnetite-sodium mixture with water to dissolve and remove the sodium-vanadium compound therefrom and produce a magnetite product containing as low as about 0.3% sodium and no more than about 1.0% SiO_2.

4,023,960

PROCESS FOR CLEANING WASTE GASES FROM SINTERING PLANTS

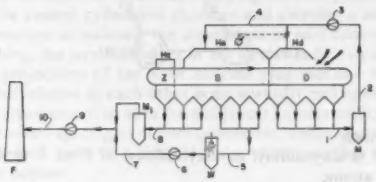
Horst Seidel; Horst Dahlmann, both of Bischofsheim; Rolf Bothe, Falkenstein, and Hermann Schmidt, Bergen-Enkheim, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 408,799, Oct. 23, 1973, abandoned. This application May 22, 1975, Ser. No. 579,937

Claims priority, application Germany, Oct. 25, 1972, 2252245

Int. Cl.² C22B *1/212*

U.S. Cl. 75—5 **5 Claims**



1. A method for cleaning waste gases from dust and gaseous or vaporous contaminants generated from an at least partially covered traveling grate-type sintering line wherein a sinter cake is produced by sintering a fine grained charge mixture of ore and solid fuel, the sintering line comprising an ignition zone, a sintering zone and a burning zone, said method comprising:

returning process gas containing at least about 16 percent oxygen from the burning zone to the sintering zone, the sintering zone being defined as that section of the sintering line wherein the sinter front passes through the charge mixture and wherein substantially all of the moisture in the charge mixture is expelled and the average waste gas temperature is from about 50° C. to about 70° C. and the burning zone being defined as that section of the sintering line immediately following the sintering zone and wherein the sinter front passes down through the charge mixture until the sinter front reaches the grate and wherein the waste gas temperature reaches a maximum shortly before passage of the sintered mixture from said burning zone;

passing the process gas returned from the burning zone through dust collector means thereafter through fan means and thence downwardly through the charge mixture in the sintering zone;

scrubbing at least that portion of the waste gas emanating from the latter third of the sintering zone thereby cleaning that portion of the waste gas from gaseous or vaporous contaminants; and

passing at least that portion of the waste gas emanating from the remainder of the sintering zone and from the ignition zone through dust collector means and cleaning that portion from dust.

4,023,961

METHOD OF PRODUCING POWDERED MATERIALS

Peter Douglas, Weedon, and Thomas Ian Stewart, Kingsthorpe, both of England, assignors to Plessey Incorporated, Melville, N.Y.

Filed Feb. 12, 1975, Ser. No. 549,279

Claims priority, application United Kingdom, Apr. 11, 1974, 16103/74; Oct. 31, 1974, 47093/74

Int. Cl.² C22B *11/04*; B22F *9/00*

U.S. Cl. 75—.5 AC **40 Claims**

1. A process of producing a powdered material comprising forming a first solution containing a member selected from the group consisting of (1) at least one chemical compound having a metal atom selected from the group consisting of gold, silver, palladium, and platinum in its molecular structure and being capable of being reduced to yield the free metal and (2) at least one chemical compound having metal and oxygen atoms in its molecular structure and being capable of being reacted to yield a free metal oxide; converting the formed first solution into an atomised spray; and chemically reacting the atomised spray with a second solution of a reducing agent selected from the group consisting of ferrous sulphate, ammonium formate, formic acid, hydroquinone, and oxalic acid, to produce a metal or metal oxide powder having a particle size which is determined by the composition of the first solution in relation to the size of the individual droplets of the atomised spray.

4,023,962

PROCESS FOR REGENERATING OR PRODUCING STEEL FROM STEEL SCRAP OR REDUCED IRON

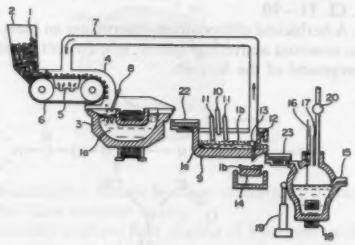
Ryuichi Nakagawa, Tokyo; Takuya Ueda, Zushi; Shiro Yoshimatsu, Tokyo; Akira Sato, Omiya; Tatsuro Mitsui, Sagamihara; Tsuyoshi Ozaki, Tokyo, and Akira Fukuzawa, Yokohama, all of Japan, assignors to National Research Institute for Metals, Tokyo, Japan

Continuation-in-part of Ser. No. 404,900, Oct. 10, 1973, abandoned. This application Apr. 24, 1975, Ser. No. 571,224

Claims priority, application Japan, Oct. 11, 1972, 47-101126

Int. Cl.² C21C *5/52*

U.S. Cl. 75—13 **8 Claims**



1. A process for regenerating or producing steel from mild steel scraps or reduced iron, which comprises, in combination, the steps of:

1. charging said steel scrap or reduced iron into a horizontal-type core-free induction furnace and melting said steel scrap or reduced iron therein,
2. adding carbon to the resulting molten steel melt so that the carbon content of the melt in said induction furnace is adjusted to 0.6 to 3.0%,
3. adding a slag-forming agent to the melt and blowing more than the stoichiometric amount, based on the above amount of carbon, of oxygen to refine the melt, and
4. adjusting the composition of the molten steel so refined, so as to obtain a steel having the composition as follows:

C : 0.07 – 0.25%
Si : 0.01 – 0.55%
Mn : 0.01 – 0.80%
P : 0.04% or less
S : 0.04% or less
Fe : remainder.

4,023,963

PROCESS FOR THE DIRECT REDUCTION OF MINERALS ON A CONTINUOUS GRATE

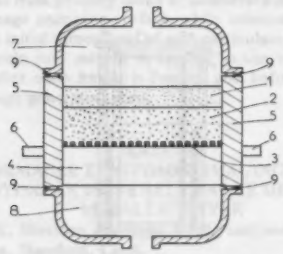
Edouard Bonnaure, Le Vesinet, France, assignor to Creusot-Loire Entreprises, Paris, France

Filed May 9, 1975, Ser. No. 575,997

Claims priority, application France, May 10, 1974, 74.16202

Int. Cl.² C21B *13/00*

U.S. Cl. 75—35 5 Claims



1. A method of reduction of minerals using an endless moving grate producing deoxidized minerals comprising the steps of charging the grate with a first layer about 50 cm thick of chemically inert metallic material comprising substantially spherical elements of a screened size substantially equal to that of the mineral to be reduced, charging upon said first layer a second layer of mineral to be reduced, heating or oxidizing firing both layers from top to bottom by a flow of neutral or oxidizing gases which heats up said inert first layer, primarily reducing said second layer by a mixed flow of carbon monoxide and hydrogen gas at a temperature of 1100° C traversing the layers from top to bottom and continuing the heating of said first inert layer, secondarily reducing said second layer by a flow of hydrogen gas introduced at a temperature of about 700° C and traversing the layers from bottom to top with heating thereof up to 1100° C by traversing the inert metallic layer, primarily cooling said layers by a flow of cold hydrogen passing from bottom to top through said layers, secondarily cooling said layers by a flow of cold hydrogen passing from top to bottom through said layers, mixing said two flows which have traversed said layers in proportions suitable for obtaining a flow at about 700° C, recycling said mixture as at least a portion of said flow of hydrogen gas for said secondary reduction and then discharging the reduced minerals from the grate.

4,023,964

METHOD OF OBTAINING COPPER FROM COPPER-BEARING ORES

Jean-Michel DeMarthe, Viroflay; Alain Sonntag, Maurepas, and André Georgeaux, Rambouillet, all of France, assignors to Societe Miniere et Metallurgique de Penarroya, Paris, France

Filed May 15, 1975, Ser. No. 577,659

Claims priority, application France, May 15, 1974, 74.16774

Int. Cl.² C22B *15/08*

U.S. Cl. 75—101 R 15 Claims

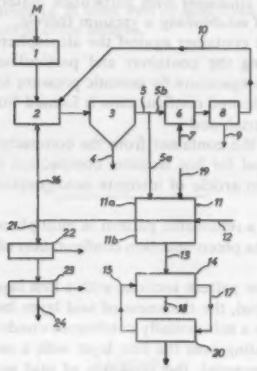
1. A method for obtaining electrolytic copper from copper-bearing ores comprising:

a. lixiviating a sulphurized copper concentrate with an aqueous solution containing cupric chloride;

b. separating into two parts the solution resulting from the lixiviation stage a), one of said parts, containing at least 1 gram of cuprous ions per liter and at last 2 grams of ferrous ions per liter, being subjected to oxidation by air at atmospheric pressure, at a pH-value of between 1 and 3 and, at a temperature above 90° C., with precipitation of goethite and separation thereof, the resulting solution then being recycled to the lixiviation stage a);

c. partially extracting the copper contained in the other of said parts of the solution resulting from the lixiviation stage a), by contacting said solution with an organic phase containing a cationic solvent, said extraction being accompanied by oxidation by the injection of air;

d. re-extracting the copper contained in said organic phase by contacting the latter with an aqueous sulphuric acid



solution and recycling the organic phase to the extraction stage c); and

e. treating the copper sulphate solution obtained from the preceding stage to obtain, on the one hand, elemental copper, and, on the other, an aqueous sulphuric acid solution which is recycled to the re-extraction stage d), the major part of the aqueous phase which results from the stage c) at which copper is partially extracted being recycled to the lixiviation stage a).

4,023,965

NI-FE-RH ALLOYS

James Carr Suits, Saratoga, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 3, 1976, Ser. No. 692,609

Int. Cl.² C22C *19/03*

U.S. Cl. 75—170 4 Claims

1. An improved corrosion resistant ferromagnetic composition comprising

$$(Ni_aFe_{100-a})_{100-x}Rh_x$$

where *a* is 65 to 90 atomic percent
x is 1 to 25 atomic percent.

4,023,966

METHOD OF HOT ISOSTATIC COMPACTION

Joseph Frederick Loersch, Bolton; Peter Alan Hurwitz, East Hartford, both of Conn., and Lester Warren Jordan, Cranston, R.I., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 6, 1975, Ser. No. 629,725

Int. Cl.² B22F *3/00*

U.S. Cl. 75—226 36 Claims

1. A method for hot isostatic compaction of particulate material into an article of intricate configuration comprising the steps of:

a. providing a removable pattern in the appropriate precompaction configuration of the article to be made;

b. coating the pattern with a first layer of conductive material, the thickness of said layer being sufficient to provide a substantially continuous conductive surface;

c. electroplating over the first layer with a second layer of

metallic material, the thickness of said second layer in combination with the thickness of said first layer being sufficient to provide a self-supporting and gas-impervious shell around the pattern;

d. removing the pattern from the shell, thereby providing a self-supporting and gas-impervious container for receiving and confining the particulate material in the appropriate precompaction configuration of the article to be made;

e. filling the container with particulate material, including the step of establishing a vacuum therein;

f. sealing the container against the atmosphere;

g. compacting the container and particulate material at elevated temperature by isostatic pressure so that a dense article of desired configuration is formed from the particulate material; and

h. removing the container from the compacted article.

12. A method for hot isostatic compaction of particulate material into an article of intricate configuration comprising the steps of:

a. providing a removable pattern in multiple sections in the appropriate precompaction configuration of the article to be made;

b. coating the pattern sections with a first layer of conductive material, the thickness of said layer being sufficient to provide a substantially continuous conductive surface;

c. electroplating over the first layer with a second layer of metallic material, the thickness of said second layer in combination with the thickness of said first layer being sufficient to provide self-supporting and gas-impervious shell sections around the pattern sections;

d. removing the pattern sections from the shell sections;

e. joining the shell sections together, thereby providing a self-supporting and gas-impervious container for receiving and confining the particulate material in the appropriate precompaction configuration of the article to be made;

f. filling the container with particulate material, including the step of establishing a vacuum therein;

g. sealing the container against the atmosphere;

h. compacting the container and particulate material at elevated temperature by isostatic pressure so that a dense article of desired configuration is formed from the particulate material; and

i. removing the container from the compacted article.

23. A method for hot isostatic compaction of nickel-base superalloy particulate material into a gas turbine engine component comprising the steps of:

a. providing a removable, nonconductive pattern in the appropriate precompaction configuration of the component to be made;

b. electroless-depositing on the pattern a first layer of conductive material, the thickness of said layer being sufficient to provide a substantially continuous conductive surface for subsequent coating;

c. electroplating the first layer with a second layer of metallic material, the thickness of said second layer in combination with the thickness of said first layer being sufficient to provide a self-supporting and gas-impervious shell around the pattern;

d. removing the pattern from the shell, thereby providing a self-supporting and gas-impervious container for receiving and confining the powder in the appropriate precompaction configuration of the component;

e. filling the container with particulate material, including the step of establishing a vacuum therein;

f. sealing the container against the atmosphere;

g. compacting the container and particulate material at elevated temperature by isostatic pressure so that a near 100 percent dense component is formed from the particulate material; and

h. removing the container from the compacted component.

4,023,967

ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT IS MAINTAINED

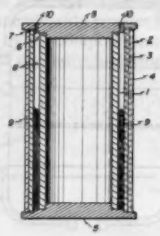
Graeme McGibbon, Knebworth, England, assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 25, 1974, Ser. No. 464,258

Claims priority, application United Kingdom, Sept. 7, 1973, 42185/73

Int. Cl.² G03G *13/10, 15/10, 5/00*

U.S. Cl. 96—1 LY **8 Claims**



1. A method for effecting and maintaining a uniform substantial interface contact for liquid xerographic development between a xerographic liquid toner applicator roll and a cooperating electrostatic latent image-bearing surface, one of which is rigid and contains surface irregularities, and the other a non-rigid member comprising:

a. a rigid core and end-supporting means; and

b. a flexible sleeve mounted over the core component of the core and end-supporting means, said sleeve maintaining functional integrity as a photoreceptor or liquid developer applicator having a pattern of lands and valleys, and in contact with the interfacing member; comprising effecting liquid development of the latent electrostatic image by developmental contact, with a latent electrostatic image, utilizing as part of the non-rigid member a flexible sleeve with a substantially greater circumference than the core component and spaced substantially uniformly apart from the core component by attachment to end supporting means and by particularly cured low temperature curing monomer-containing foam material intermediate the core and the sleeve to maintain a spaced relationship between the core component and the flexible sleeve.

4,023,968

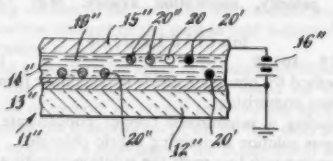
PHOTOELECTROPHORETIC COLOR IMAGING PROCESS IN WHICH BACK MIGRATION IS ELIMINATED

Alan B. Amidon, and Joseph Mammino, both of Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 25, 1972, Ser. No. 300,532

Int. Cl.² G03G *17/04*

U.S. Cl. 96—1.3 **15 Claims**



1. In an electrophoretic reproduction process wherein a colored reproduction of an original is obtained by sequentially electrophoretically generating at least two visible monochromatic images, and superimposing said images in registry upon

an image receiving surface to form a colored reproduction, the improvement comprising essentially eliminating back migration of particulate marking materials from the image receiving surface to the imaging suspension in the second and subsequent image generating steps by employing, in each instance, particulate marking materials comprising a solvent tackifiable polymer and a colorant and/or an image receiving surface containing a solvent tackifiable polymer, and applying to the image receiving surface at least a partial solvent for said tackifiable polymer in an amount sufficient to render said polymer at least partially tacky to adhesively secure the image to the ima ceiving surface while substantially retaining intact the initial dimensions of said particulate marking materials wherein said solvent is applied to the image receiving surface after each image is formed and before each subsequent image generating step.

4,023,969
DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER

Nicholas K. Sheridon, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 3, 1975, Ser. No. 538,281
Int. Cl.² G03G *5/00, 17/00*
U.S. Cl. 96—1.5 **11 Claims**

1. A deformation imaging member comprising a series of contiguous layers including an opaque deformable metallic layer arranged between a first and second deformable layer, wherein said first and second deformable material layers each comprise an elastomer having a volume resistivity above about 10^8 ohm-cm and said first deformable elastomer containing layer having a dielectric constant which differs from that of said second deformable elastomer containing layer by at least about 1% and contiguous with the surface of the first deformable layer, opposite to the surface in contact with the deformable metallic layer, a layer of photoconductive insulating material.

4,023,970
LIGHT-SENSITIVE COLOR PHOTOGRAPHIC MATERIAL WITH MASKING LAYER COMPRISING SPONTANEOUSLY SILVER HALIDE

Ehrhard Hellmig, and Erwin Ranz, both of Leverkusen, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Apr. 28, 1975, Ser. No. 571,959
Claims priority, application Germany, May 2, 1974, 2421068
Int. Cl.² G03C *7/04, 1/76, 7/16*
U.S. Cl. 96—6 **9 Claims**

8. The process of producing color corrected multicolor images comprising the step of simultaneously color developing in superimposed relationship a cyan, a magenta and a yellow partial color image and a yellow to magenta masking image, wherein the improvement comprises

providing a light sensitive color photographic material essentially consisting of a support and in superimposed relationship spectrally sensitive silver halide emulsion layer units, one of which is predominantly sensitive to red light and has associated with it a colorless cyan-forming coupler, another of which is predominantly sensitive to blue light and has associated with it a colorless yellow-forming coupler, at least two of said red-sensitive, green-sensitive and blue-sensitive layer units having associated with them color couplers producing on chromogenic development image dyes which have unwanted side densities,

providing in said light sensitive color photographic material a single additional silver halide emulsion layer which has a lower sensitivity than anyone of said red-sensitive, green-sensitive and blue-sensitive layer units, has been fogged to a degree that produces on chromogenic development a colour density of between 0.2 and 1.0 in said additional layer, and has associated with it at least one colorless coupler for producing on chromogenic development a yellow to magenta masking image,

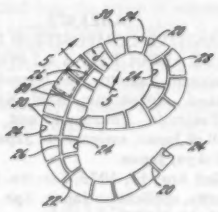
imagewise exposing said material and

color developing said material, thereby producing simultaneously cyan, magenta and yellow partial color images in said red-sensitive, green-sensitive and blue-sensitive layer units and a yellow to magenta masking image in said single additional layer that compensates for the unwanted side densities of at least two of said cyan, magenta and yellow partial color images.

4,023,971
FILM AND METHOD FOR FORMING INTAGLIO PRINTING PLATES

Harry S. Vested, P.O. Box 13, Mount Morris, Ill. 61054

Continuation of Ser. No. 525,837, Nov. 21, 1974, abandoned, and a continuation-in-part of Ser. No. 339,862, March 9, 1973, abandoned. This application Apr. 26, 1976, Ser. No. 679,894
Int. Cl.² G03F *7/02;* **B41C** *1/02*
U.S. Cl. 96—36.3 **6 Claims**



1. In a phototypesettng method of forming a printing plate for intaglio printing which comprises making a film having text characters thereon with at least portions of at least certain of said characters being rectilinear and at least portions of at least certain of said characters being curvilinear and non-rectilinear, said characters comprising a plurality of ink well areas separated by a plurality of doctor blade support areas within each character; exposing a gravure printing plate photoresist to light passed through said film; and then etching the unexposed and processed portions of the printing plate with a solution to form a plurality of ink wells defining said text characters and doctor blade supports, the improvement comprising:

making said film with the center lines of said doctor blade support areas intersecting each other and the edges of said text characters, including both the said rectilinear and the curvilinear and non-rectilinear character edges, at angles of about 90° to facilitate the flow of etching solution into and out of the corners of the well areas formed in the exposed and processed photoresist at said intersections, to minimize the distance between the resulting adjacent etched ink wells at said intersections, and to facilitate the flow of ink into and out of the corners of the resulting wells at said intersections.

4,023,972

METHOD OF PREPARING A BLEND OF FOGGED, DIRECT-POSITIVE SILVER HALIDE EMULSIONS OF DIFFERENT AVERAGE GRAIN SIZES

Willy Joseph Vanassche, Kontich, and Herman Alberik Pattyn, Kapellen, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed June 7, 1974, Ser. No. 477,210

Claims priority, application United Kingdom, June 18, 1973, 28769/73

Int. Cl.² G03C *1/36, 1/28*

U.S. Cl. 96—101 12 Claims

1. Method of making a direct-positive photographic silver halide material which comprises a support and a layer of an emulsion blend having a pAg value of at least 8.35, by the steps of:

1. preparing two or more direct-positive silver halide emulsions of different average grain-sizes comprising fogged silver halide grains and having pAg values below 8.35, wherein one direct-positive silver halide emulsion of the blend has an average grain size of at least 50% greater than another emulsion of the blend,
2. raising the pAg values of the separate emulsions to a value of at least 8.35 and subsequently blending the emulsions or blending the separate emulsions and subsequently raising the pAg of the emulsion blend to a value of at least 8.35,
3. providing at least one halogen conducting or electron-accepting compound at the surface of the fogged silver halide grains prior to raising the pAg value to a value of at least 8.35, and
4. coating on a support layer of the emulsion blend having a pAg value of at least 8.35.

4,023,973

PHOTOSENSITIVE COMPOSITION USING MALEIC ANHYDRIDE ADDUCT OF A 1,2 POLYBUTADIENE

Fumitake Imaizumi, Yamato; Isao Nagaoka, Yokkaichi; Mitsuo Kurokawa, Yokohama; Koei Komatsu, Yokkaichi; Yasuyuki Takimoto, Takatsuki, and Hidefumi Kusuda, Hirakata, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Apr. 17, 1975, Ser. No. 569,145

Claims priority, application Japan, Apr. 8, 1974, 49-44116; Mar. 11, 1975, 50-28688

Int. Cl.² G03C *1/70, 1/68*

U.S. Cl. 96—115 R 22 Claims

1. A photosensitive composition, comprising:

a mixture of a maleic anhydride adduct of a 1,2-polybutadiene having a viscosity-average molecular weight of at least 10,000 and having a vinyl content of at least 70% and at least one member selected from the group consisting of photosensitizers and photosensitive cross-linking agents, wherein said photosensitizer is selected from the group consisting of carbonyl compounds, nitro compounds, aromatic hydrocarbon compounds, haloketones and acyloin ethers, and wherein said photosensitive cross-linking agent is an azido type cross-linking agent, whereby, when said photosensitive composition on a supporting substrate is exposed to light, that portion of said composition exposed to light hardens, while that portion of said composition which is masked from light, remains unhardened and is readily removed from the hardened composition by treatment with water, an alcohol or a mixture of water, an alcohol and an ether, thereby leaving the hardened image on its supporting substrate.

2. A photosensitive composition according to claim 1, wherein the 1,2-polybutadiene has a visocisty-average molecular weight of 10,000 to 150,000.

4,023,974

UNBURNT LEAD REFILL FOR WRITING AND DRAWING PENCILS

Werner Handl, Altdorf, Germany, assignor to J. S. Staedtler, Nurnberg, Germany

Filed Sept. 8, 1975, Ser. No. 611,394

Claims priority, application Germany, Sept. 7, 1974, 2442983

Int. Cl.² C09D *11/14*

U.S. Cl. 106—26 5 Claims

1. An unburnt pencil lead for writing and drawing pencils, comprising dyestuff, lubricant, filling material, binding agent, said binding agent being selected from the group of methyl cellulose, methyl hydroxy-ethyl cellulose, methyl hydroxy-propyl cellulose, and hydroxy ethyl cellulose, which has been at least partially cross-linked with benzaldehyde.

4,023,975

HOT PRESSED SILICON CARBIDE CONTAINING BERYLLIUM CARBIDE

Svanite Prochazka, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,481

Int. Cl.² C04B *35/52, 35/70*

U.S. Cl. 106—44 9 Claims

1. A method of preparing a polycrystalline silicon carbide body having a density of at least 98% of the theoretical density of silicon carbide comprising admixing silicon carbide particles with an amount of beryllium carbide particles ranging from 0.1% by weight to 1.5% by weight of said silicon carbide to form a mixture, said particles ranging from submicron size to 5 microns, and hot pressing the resulting particulate mixture at a temperature ranging from 1850° C to 2300° C under a minimum pressure of 3000 psi.

7. A polycrystalline silicon carbide body having a significantly uniform microstructure with a grain size ranging up to 50 microns and a density ranging from 98% to 100% of the density of silicon carbide, said body consisting essentially of silicon carbide and beryllium carbide, said silicon carbide being composed of from 50% by weight to 100% by weight of α-silicon carbide with the remainder being β-silicon carbide, said beryllium carbide being present in an amount ranging from 0.1% by weight to 1.5% by weight of the total amount of said silicon carbide, a minor portion of said beryllium carbide being in solid solution with said silicon carbide with the remainder being in the form of grains of a beryllium carbide phase.

4,023,976

MANUFACTURE OF GLASS USING BRIQUETTES

William C. Bauer, Boulder, Colo., and Richard Irving Howard, deceased, late of Pocatello, Idaho (by Kate Johnson Howard, executrix), assignors to FMC Corporation, Philadelphia, Pa.

Filed Jan. 23, 1976, Ser. No. 651,941

Int. Cl.² C03C *3/04;* C03B *5/16;* C09C *1/56*

U.S. Cl. 106—52 22 Claims

1. A process for the continuous manufacture of glass from glass batch comprising silicon dioxide, soda ash and a calcium carbonate or calcium oxide in a glass furnace comprising:

a. adding to the glass batch a binder selected from the group consisting of water and an aqueous caustic soda solution, in amounts up to 10% by weight of the batch,
b. aging the glass batch and binder for a period of at least 10 minutes,
c. compacting the glass batch and binder by compressing same in a prebriquetting stage,
d. dividing the compacted glass batch and binder into particulate form,
e. briquetting the particulates of glass batch and binder by compressing same into discrete briquetted shapes,
f. heating the briquetted shapes to temperatures of from about 750° C to about 900° C for a time sufficient to

convert said silicon dioxide through a fluid state to a solid state to obtain substantial conversion of said silicon dioxide in the glass batch to silicates,

g. introducing the heat-treated briquetted shapes of step (f) into a glass furnace at a temperature not above 2,600° F (1,430° C) whereby volatilization of sodium values from the furnace is reduced, and

h. recovering refined molten glass from the furnace.

11. Process of producing partially reacted, strong, shock-resistant briquetted shapes, suitable as a glass batch feed to a glass furnace comprising:

a. adding to a glass batch comprising silicon dioxide, soda ash and a calcium carbonate or calcium oxide a binder selected from the group consisting of water and an aqueous caustic soda solution, in amounts up to 10% by weight of the batch,

b. aging the glass batch and binder for a period of at least 10 minutes,

c. compacting the glass batch and binder by compressing same in a prebriquetting stage,

d. dividing the compacted glass batch and binder into particulate form,

e. briquetting the particulates of glass batch and binder by compressing same into discrete briquetted shapes,

f. heating the briquetted shapes to temperatures of from about 750° C to about 900° C for a time sufficient to convert said silicon dioxide through a fluid state to a solid state to obtain substantial conversion of said silicon dioxide in the glass batch to silicates, and

g. recovering partially reacted, strong, shock-resistant briquetted shapes.

20. A partially reacted, strong, shock-resistant briquetted shape, suitable as a glass batch feed to a glass furnace produced by:

a. adding to a glass batch comprising silicon dioxide, soda ash and a calcium carbonate or calcium oxide a binder selected from the group consisting of water and an aqueous caustic soda solution, in amounts up to 10% by weight of the batch,

b. aging the glass batch and binder for a period of at least 10 minutes,

c. compacting the glass batch and binder by compressing same in a prebriquetting stage,

d. dividing the compacted glass batch and binder into particulate form,

e. briquetting the particulates of glass batch and binder by compressing same into a discrete briquetted shape,

f. heating the briquetted shape to temperatures of from about 750° C to about 900° C for a time sufficient to convert said silicon dioxide through a fluid state to a solid state to obtain substantial conversion of said silicon dioxide in the glass batch to silicates, and

g. recovering a partially reacted, strong, shock-resistant briquetted shape.

4,023,977

ACRYLIC OLIGOMERS AS MELT FLOW MODIFIERS OF THERMOPLASTIC COATINGS AND POWDERS

Andrew Mercurio, Hatboro, and Sheldon N. Lewis, Willow Grove, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

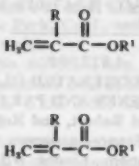
Continuation of Ser. No. 255,878, May 10, 1972, abandoned. This application May 7, 1975, Ser. No. 575,323

Int. Cl.² C08L *1/08;* **C08K** *5/10*

U.S. Cl. 106—178 **20 Claims**

1. A mixture of:

A. A low molecular weight melt flow modifying oligomer consisting essentially of a vinyl oligomer having a number average chain length of about 4 to about 25 mers, a narrow molecular weight distribution such that the heterogeneity index is 2 or less, and the calculated T_g is above 30° C., in which said oligomer is composed of one or more monomers selected from those of the formula:



wherein R^1 is H, alkyl, aminoalkyl, hydroxyalkyl, cycloalkyl, or aryl and R is H or methyl; and

B. A high molecular weight thermoplastic resin or blend of such resins selected from the group consisting of cellulose esters, nylons, epoxies, silicones, polysulfides, vinyl polymers, acetal polymers, polycarbonates, polysulfones, polyphenylene oxide, polyimides, polyxylylenes, chlorinated polyethers, alkyds, and polyesters

A being present in a minor amount with relation to B.

4,023,978

AEROSOL SPRAY STARCH FORMULATION

Ralph Paul Messina, Somerset, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 410,597, Oct. 29, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,736

Int. Cl.² C08L *3/00*

U.S. Cl. 106—213 **9 Claims**

1. An aerosol starch formulation for use in finishing laundered textile garments comprising from about 2 to about 10 parts by weight of a liquefied normally gaseous propellant and from about 98 to about 90 parts by weight of an aqueous starch composition consisting essentially of water and from about 2 to about 6 percent by weight starch, from about 0.05 to about 1.0 percent by weight of a polyhydric material which enhances the wetting and anti-clogging properties of the composition and is selected from the group of polymeric glycols of alkanes and olefins having from 2 to about 6 carbon atoms, from about 0.01 to about 0.5 percent by weight of a nonionic surfactant, from about 0.05 to about 0.15 percent by weight of boric acid and from about 0.2 to about 0.6 percent by weight of borax, said formulation having a substantially reduced tendency to flake when applied onto fabric which is then ironed.

4,023,979

PROCESS FOR PRODUCING CARBONACEOUS SUBSTANCES FOR USE IN SYNTHETIC-GRAPHITE AND GRAPHITE-LIKE BODIES

Hartmut Luhleich, Duren; Hubertus Nickel, Julich; Peter Pflaum, Julich, and Francesco Dias, Julich, all of Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Continuation-in-part of Ser. No. 267,480, June 29, 1972. This application May 16, 1975, Ser. No. 578,220

Claims priority, application Germany, June 30, 1971, 2132492

Int. Cl.² C08L *95/00*

U.S. Cl. 106—284 **7 Claims**

1. A process for producing a carbonaceous mass for production of shaped bodies, comprising the steps of:

slurrying particles of a carbonaceous filler selected from the group which consists of graphite, coke and carbon black in a binder at least partly dissolved in a solvent and selected from the group which consists of bitumens, pitch and tar, to produce a slurry of binder-coated particles;

continuously dispersing said slurry by supplying it from a nozzle continuously and codirectionally into a continuous stream of liquid in which said binder is at most slightly soluble and which is miscible with said solvent to form discrete binder-coated grains of the filler; and

decanting excess quantities of said liquid from said discrete binder-coated grains to form said mass.

4,023,980

BLENDS OF HYDROGENATED OLIGOMERS OF CYCLOPENTADIENES AND PARAFFINIC OILS

Marcel Prillieux; Marcel Robert, and Robert Tirtiaux, all of Mont-Saint-Aignan, France, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed July 11, 1975, Ser. No. 595,237

Claims priority, application France, July 17, 1974, 74.24784; United Kingdom, Jan. 3, 1975, 161/75

Int. Cl.² C09D *3/00*

U.S. Cl. 106—285 **6 Claims**

1. A blend comprising from 40% to 99% by weight of a paraffinic oil having a viscosity between 2 and 30 centistokes at 37.8° C and selected from the group consisting of paraffinic mineral oils and synthetic oils made by oligomerizing in the presence of a Friedel Crafts catalyst and olefin selected from the group consisting of propylene, isobutylene and n-butene followed by hydrogenating the oligomer; and from 1% to 60% by weight of a hydrogenated oligomer fraction from a distilling range of 170°–400° C, having a viscosity of less than 100 centistrokes at 37.8° C, prepared by hydrogenating oligomers of cyclopentadiene or a methyl cyclopentadiene.

4,023,981

PROCESS FOR THE PREPARATION OF PIGMENTARY METALLIC PARTICLES COATED WITH AN ORGANIC POLYMER AND COMPOSITIONS RESULTING THEREFROM

Jean Perronin, Chantilly, and Bernard Jean Robert Gurtner, Creil, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed June 4, 1975, Ser. No. 583,814

Claims priority, application France, June 14, 1974, 74.20673

Int. Cl.² C09C *3/10*

U.S. Cl. 106—308 Q **15 Claims**

1. A process for the preparation of pigmentary compositions which comprises coating metallic particles of pigment by means of a polymer or copolymer, by covering by the polymerization or copolymerization "in situ" of at least one ethylenically unsaturated monomer having at least one oxygen or nitrogen heteroatom, and having a mono- or di-carboxylic acid function, or an ester, nitrile or amide function, or an N-substituted amide function, or an amine, alcohol or ether function, wherein the polymerization or copolymerization reaction is effected in a medium comprising at least one organic solvent in which the monomer is soluble and in the presence of at least one polymerization catalyst soluble in this medium, the monomer and the proportion thereof being selected so that the polymer or copolymer formed is insoluble in the organic solvent used.

4,023,982

APPARATUS FOR THE PRODUCTION OF SUGARS FROM HEMI-CELLULOSE-CONTAINING RAW MATERIALS

Hans H. Knauth, Ravensburg, Germany, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Dec. 1, 1975, Ser. No. 636,743

Claims priority, application Switzerland, Dec. 3, 1974, 15999/74

Int. Cl.² C13K *1/02, 13/00*

U.S. Cl. 127—1 **12 Claims**

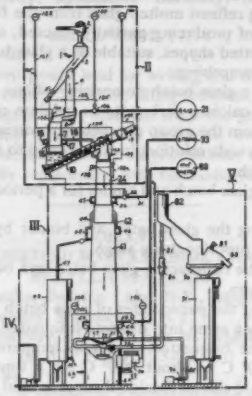
1. An apparatus for the continuous production of sugars from hemi-cellulose-containing raw materials comprising

a venting vessel for receiving a flow of the raw material and steam;

an impregnating vessel below said venting vessel for impregnating the flow of raw material with acid;

a reaction vessel below said impregnating vessel for steam-heating the flow of the acid-impregnating raw material to hydrolyze the raw material;

a conveyor in said impregnating vessel for conveying the acid-impregnated raw material from said impregnating vessel to said reaction vessel; and



an extraction vessel below said reaction vessel for passing hot water in counter-flow to the hydrolyzed raw material to extract a sugar from the hydrolyzed raw material and from a hydrolysis product of the hot water and extracted sugar.

4,023,983

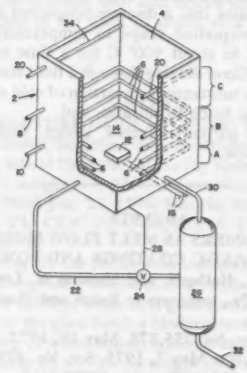
VAPOR CLEANING SYSTEM

Howard F. Houke, Concord, and Freeman C. Anderson, Pleasant Hill, both of Calif., assignors to Collins Machinery Corporation, Concord, Calif.

Filed Oct. 28, 1975, Ser. No. 626,091

Int. Cl.² B08B *5/00*

U.S. Cl. 134—11 **7 Claims**



1. In a method for cleaning a solid substance within a cleaning vessel open to the atmosphere at its top wherein vapors of a conbustible cleaning solvent are passed through a cleaning zone in said vessel containing said solid substance and are condensed within said zone, so that said solid substance is contacted with said cleaning solvent which is in both the liquid and vapor state, the improvement in avoiding explosive mixtures of said vapors with air which comprises maintaining a

buffer layer of a non-combustible gas immediately above said cleaning zone between the vapors of said cleaning solvent and the air in the atmosphere; said gas (1) being unreactive with the vapors of said cleaning solvent, (2) having a density at conditions existent within said buffer layer which is greater than the density of air at ambient conditions and (3) having a boiling point below the boiling point of said cleaning solvent.

4,023,984

AZEOTROPIC SOLVENT COMPOSITION FOR CLEANING

John Joseph Clementson, and Arisztid Lajos Horvath, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 433,403, Jan. 14, 1974, Pat. No. 3,932,297. This application Aug. 19, 1975, Ser. No. 607,205
Claims priority, application United Kingdom, Feb. 2, 1973, 5238/73
Int. Cl.² B08B *3/08, 3/12*
U.S. Cl. 134—38 **2 Claims**

1. An azeotropic composition consisting essentially of 1,1,1-trichloroethane and iso-propanol, wherein the proportion of iso-propanol is 18.2% by weight of the composition, said composition having a boiling point of 68.7° C.

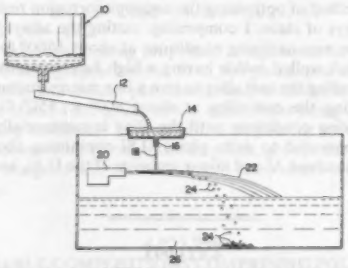
2. A method of cleaning a printed circuit board contaminated with soldering flux which comprises contacting said printed circuit board with the composition of claim 1.

4,023,985

STEEL ABRASIVES AND METHOD FOR PRODUCING SAME

Fred J. Dunkerley, Broomall, Pa.; Albert J. Gaudino, Parma, and Robert P. Vilyus, Maple Heights, both of Ohio, assignors to Cleveland Metal Abrasive, Inc., Cleveland, Ohio

Filed Sept. 29, 1975, Ser. No. 617,362
Int. Cl.² B22D *23/08*
U.S. Cl. 148—3 **9 Claims**



1. A method of producing cast steel shot having a microstructure of substantially all martensite tempered to a hardness in the range of from about 40 to 50 on the Rockwell C Scale which includes the steps of charging, melting, refining, pouring and tempering,

said pouring step being performed by directing a stream of the melted and refined molten steel through a stream of fluid under pressure and into a fluid quenching bath to produce shot in an as-cast condition having a substantially fully martensitic structure and corresponding full hardness; and,

said tempering step being performed on said shot while in its as-cast condition whereby an intermediate step of heat treating for hardening is eliminated.

4,023,986

CHEMICAL SURFACE COATING BATH

Saul Kessler, Canoga Park, Calif., assignor to Joseph W. Aldiin, Los Angeles, Calif.

Division of Ser. No. 607,127, Aug. 25, 1975, Pat. No. 3,996,115. This application Dec. 8, 1975, Ser. No. 638,856
Int. Cl.² C23F *7/02, 7/08, 7/26*
U.S. Cl. 148—6.14 R **10 Claims**

1. A method of forming a passivated salt or oxide layer on the surface of a metal article comprising applying to the surface an aqueous composition for a time sufficient to form said layer thereon, said composition including:

a. an oxidant or reactive anion capable of forming the salt or oxide layer;

b. an effective amount of an additive for providing a more organized and dense salt or oxide layer comprising the reation product of an at least trihalogenated fluoride, chloride, bromide or iodide of a Group 1*b*, 2, 3*a*, 4*b*, 5*b*, 6*b*, or 8 metal and a polyhaloalkyl substituted arylamine.

4,023,987

METHOD OF PRODUCING SOFT THIN STEEL SHEET BY CONTINUOUS ANNEALING

Giichiro Nomura, Kudamatsu; Takuo Ando, Yokohama; Keiji Ariga, Kudamatsu; Akira Ikeda, Kudamatsu; Kinji Saijo, Kudamatsu, and Taizo Sato, Kudamatsu, all of Japan, assignors to Toyo Kohan Co., Ltd., Japan

Filed Dec. 10, 1975, Ser. No. 639,608
Claims priority, application Japan, Dec. 20, 1974, 49-145750
Int. Cl.² C21D *9/48*
U.S. Cl. 148—12 D **6 Claims**

1. A method of producing a soft thin steel sheet in a continuous annealing heat cycle for tin plate and black plate with T-2½ or T-3 tempering properties which consists of:

a. heating a steel strip to a soaking temperature ranging from the recrystallization temperature to 900° C by a continuous annealing furnace, without an overaging zone, used in annealing black plate,

b. maintaining said heat soaking temperature for 16 to 48 seconds,

c. cooling to about 550° C in 20 to 60 seconds,

d. cooling from 550° C to 250° C within 30 seconds and

e. cooling to room temperature in 16 to 48 seconds,

said steel strip being that produced by rolling a rimmed or capped steel ingot to form a slab, hot-strip rolling, and cold rolling to form a steel strip, the composition of said steel strip consisting essentially of: C 0.050%, Mn 0.50%, S 0.025%, N 0.0030%, P 0.012%, (Mn%) − (55/16) (0%) /(S%) 20, Fe and inevitable residual impurities.

4,023,988

HEAT TREATMENT FOR BALL BEARING STEEL TO IMPROVE RESISTANCE TO ROLLING CONTACT FATIGUE

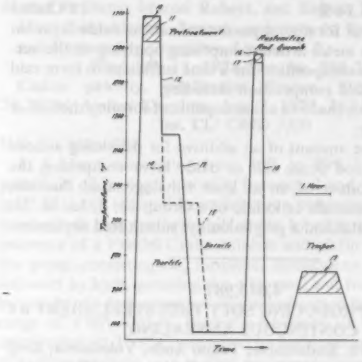
Charles A. Stickels, Ann Arbor; Anthony T. Anderson, Romulus, and Adam M. Janotik, Grosse Ile, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 2, 1976, Ser. No. 654,673
Int. Cl.² C21D *9/40*
U.S. Cl. 148—12.4 **9 Claims**

1. In a method for preparing bearing components wherein a hot-formed shape of low alloy steel containing carbon in the range of 0.6–1.5% and containing alloying ingredients in an amount to achieve a hardening response from heat treatment throughout said shape, said alloying ingredients being selected from the group consisting of Cr, Mn, Ni, Cu and Mo, said shape being subjected sequentially to a spheroidizing-anneal treatment, a rough forming treatment, and a hardening austenitizing treatment, the improvement comprising:

a. establishing a microstructure having finely divided uni-

formly distributed carbides, said microstructure having relatively thin carbide films at prior austenite grain boundaries, said microstructure being established just prior to the hardening austenitizing treatment, and



b. employing an austenitizing temperature for said hardening-austenitizing treatment which is consistently above the austenitizing temperature required to achieve peak hardening for said low alloy steel.

4,023,989

METHOD FOR PRODUCING CORDED STEEL WIRE

Emerick J. Dobo, Cary, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 20, 1975, Ser. No. 623,845

Int. Cl.² C21D *1/48;* B21F *7/00;* D01D *5/08*

U.S. Cl. 148—16 **9 Claims**

1. A method for producing steel wire cord from particles of iron oxide with the aid of a fiber-forming acrylic polymer, said method comprising the following steps in sequence:

a. providing a spinning dope wherein particles of iron oxide having an average diameter of about 5 microns or less are uniformly dispersed in a solution of acrylic polymer with the weight ratio of iron oxide to acrylic polymer being within the range of from about 3:1 to 7:1, respectively;

b. forming a plurality of continuous filaments by extruding said dope through a spinnerette and into a coagulation bath;

c. stretching said filaments from about one to three times their initial length in a boiling water bath;

d. twisting said filaments to form a precursor cord; and

e. converting said precursor cord to steel wire cord by exposing said precursor to a gaseous atmosphere consisting of from about 80 to 94 percent by volume of hydrogen, from about 2 to 15 percent by volume carbon monoxide, and from 0 to 10 percent by volume of a gaseous hydrocarbon at a temperature in the range of from about 900° C. to 1150° C. for a period of from about 3 to 8 minutes.

4,023,990

DYNAMO OR ELECTRO BAND

Albert Lex, Dortmund, Germany, assignor to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed Sept. 29, 1975, Ser. No. 617,398

Claims priority, application Germany, Sept. 28, 1974, 2446509

Int. Cl.² C22C *38/02, 38/14*

U.S. Cl. 148—31.55 **2 Claims**

1. A dynamo or electro band made of a steel consisting of 0.004 to 0.05% of carbon, 0.10 to 4.0% of silicon, not more than 0.45% of manganese, not in excess of 0.60% aluminum, from 0.030 to 0.250% of phosphorus, from 0.02 to 0.2% of zirconium and the remainder iron with the usual impurities, said steel having been subjected to a vacuum while in the liquid condition and subsequently warm rolled, pickled, cold rolled and continuously annealed at a temperature of from 750° to 1,250° C for a time period of from 1 to 7 minutes.

4,023,991

ANISOTROPIC PERMANENT MAGNET OF MN-AL-C ALLOY

Takao Kubo, Kawachinagano; Tadao Ohtani, Katano; Shigeru Kojima, Kyoto; Nobuyuki Kato, Katano; Kiyoshi Kojima; Yoichi Sakamoto, both of Hirakata; Isago Konno, and Masaharu Tsukahara, both of Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 491,498, July 23, 1974, Pat. No. 3,976,519. This application June 1, 1976, Ser. No. 692,020

Claims priority, application Japan, Aug. 2, 1973, 48-87391; Sept. 19, 1973, 48-106311

Int. Cl.² H01F *1/00;* C22C *28/00*

U.S. Cl. 148—120 **18 Claims**

1. A method of making an anisotropic permanent magnet comprising the steps of subjecting an alloy comprising 68.0% to 73.0% by weight of manganese, (1/10 Mn–6.6)% to (1/3 Mn – 22.2)% by weight of carbon and the remainder aluminum to plastic deformation at a temperature of 530° to 830° C in order to make the alloy magnetically anisotropic.

4,023,992

URANIUM-BASE ALLOYS

Alan Malcolm Ross, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed May 30, 1974, Ser. No. 474,412

Claims priority, application Canada, June 28, 1973, 175142

Int. Cl.² C21D *1/00;* C22C *28/00*

U.S. Cl. 148—132 **8 Claims**

1. Uranium alloys consisting essentially of from about 3.2 to about 3.7 wt.% silicon, from about 0.8 to about 3 wt.% aluminum, and the balance uranium, except that when the aluminum content is not more than 1.5 wt.% the Si content is less than 3.5 wt.%.

7. A method of optimizing the aqueous corrosion resistance of the alloys of claim 1 comprising: casting the alloys from a melt under non-oxidizing conditions at about 1500° to 1600° C into thick-walled molds having a high heat capacity while rapidly cooling the cast alloy to give a fine microstructure; and heat-treating the cast alloy at about 800° to 850° C under non-oxidizing conditions until the alloy is substantially completely converted to delta phase U_3Si containing about 0.5 wt.% of dissolved Al and minor amounts of the U_3Si_2 and UAl_2 phases.

4,023,993

METHOD OF MAKING AN ELECTRICALLY PUMPED SOLID-STATE DISTRIBUTED FEEDBACK LASER

Donald R. Scifres, Los Altos; William Streifer, Palo Alto, and Robert D. Burnham, Los Altos Hills, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 499,671, Aug. 22, 1974. This application Aug. 28, 1975, Ser. No. 608,425

Int. Cl.² H01L *21/208;* H05B *33/00*

U.S. Cl. 148—172 **7 Claims**

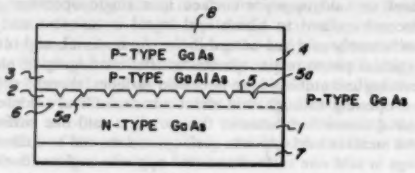
1. A method of making an electrically pumped, distributed feedback, solid-state laser device comprising the steps of:

forming a periodic structure having a regular repetition rate in a first layer of doped semiconductor material,

forming a second layer of semiconductor material on said

first layer, said first layer having a higher refractive index then said second layer,

forming a p-n junction in said first layer, said second layer and said p-n junction defining a light guiding layer, and



providing electrical contacts for said laser device such that when said device is forward biased carriers are injected across said p-n junction into said light guiding layer to initiate the production of lasing light.

4,023,994

SOLID PROPELLANT CONTAINING FERROCENE PLASTICIZER

William F. Arendale, Huntsville, Ala., assignor to Thiokol Corporation, Newtown, Pa.

Filed Sept. 9, 1963, Ser. No. 307,729

Int. Cl.² C06B *45/10*

U.S. Cl. 149—19.2 **13 Claims**

1. A solid composite type propellant composition comprising as a base propellant an oxidizer, a metallic fuel and fuel binder and between 0.1 and 10% by weight of a ferrocene plasticizer that is selected from the group consisting of mono- and di-substituted ferrocenes wherein the substituents are selected from the group consisting of —R, —COR, —CO_2R, —CH(OH)R, and —CH(R′CO_2)R wherein R and R′ are selected from the group consisting of alkyl, cycloalkyl, alkenyl and cycloalkenyl radicals, the carbon chains of which may be interrupted by oxygen.

4,023,995

EXTINGUISHABLE PROPELLANT COMPOSITION

Russell Reed, Jr., Ridgecrest, Calif., and Richard P. Cornia, Logan, Utah, assignors to Thiokol Corporation, Newtown, Pa.

Filed Sept. 11, 1975, Ser. No. 612,336

Int. Cl.² C06B *45/10, 29/22, 25/02*

U.S. Cl. 149—19.3 **12 Claims**

1. A self-extinguishing propellant composition having a low pressure deflagration limit of 30 to 200 p.s.i.a. and comprising particulate ammonium perchlorate and a binder in a weight ratio of about 4.5:1 to about 6:1, said binder being a polymer consisting essentially of fluoroalkyl acrylate or methacrylate units polymerized through the ethylenic groups thereof, said binder being the sole flame retardant component of said composition.

4,023,996

MOLDABLE COMPOSITIONS COMPRISING POLYVINYL NITRATE

Louis J. Leneveu, Pont de Buis, France, assignor to Societe Nationale des Poudres et Explosifs, France

Continuation of Ser. No. 491,619, July 24, 1974, abandoned. This application Aug. 20, 1976, Ser. No. 716,271

Claims priority, application France, Aug. 9, 1973, 73.29186; Dec. 4, 1973, 73.43246

Int. Cl.² C06B *45/10*

U.S. Cl. 149—19.8 **6 Claims**

1. Granules of a moldable thermoplastic composition useful for the production of combustible articles which consists essentially of (i) polyvinyl nitrate, (ii) at least one material selected from the group consisting of nitrocellulose and polyvinyl acetate, and (iii) 2-nitrodiphenylamine, the amount of polyvinyl nitrate being between about 30 and about 90% by weight of polyvinyl nitrate based on the total weight of components (i) and (ii), said composition additionally including (iv) an acrylonitrile-butadiene-styrene copolymer, the amount of said acrylonitrile-butadiene-styrene copolymer being greater than zero and up to 30% based on the total weight of components (i) and (ii).

4,023,997

METHOD OF PLACING AN ORIENTED ARRAY OF DEVICES ON A RELEASABLE MOUNTING

William R. Wanesky, Wescosville, Pa., assignor to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 232,735, March 8, 1972, Pat. No. 3,899,379, which is a division of Ser. No. 64,898, July 30, 1970, Pat. No. 3,690,984, which is a division of Ser. No. 729,859, April 10, 1968, Pat. No. 3,632,074, which is a continuation-in-part of Ser. No. 673,900, Oct. 9, 1967, abandoned. This application July 31, 1975, Ser. No. 600,757

Int. Cl.² H01L *7/50*

U.S. Cl. 156—631 **1 Claim**

1. A method of supporting a plurality of articles formed from a sheet of etchable material, which comprises:

applying a layer of pressure sensitive, vacuum holding material to a flat support plate that is not dissolvable in an etching solution for said sheet, said pressure sensitive, vacuum holding material selected from the group consisting of silicone rubber and silicone resin;

applying a layer of liquid wax to the layer of pressure sensitive, vacuum holding material;

placing said sheet of etchable material on said wax to cement the sheet to the layer of pressure sensitive, vacuum holding material;

applying resist patterns to conform to the shapes of the articles to be formed from the sheet;

applying an etching solution to said exposed areas of said sheet to etch away the sheet between the resist patterns;

removing the resist patterns;

applying pressure to said support plate and said articles; and

immersing said support plate and said articles in a solvent to dissolve the wax while the applied pressure forces the article in holding engagement with the now dewaxed pressure sensitive, vacuum holding layer.

4,023,998

METHOD FOR THE PRODUCTION OF THROUGH HOLES IN A LAMINATE

Kjell A. Cederberg; Jiri K. Konicek, and Hans R. Malm, all of Perstorp, Sweden, assignors to Perstorp AB, Perstorp, Sweden

Filed Aug. 26, 1975, Ser. No. 607,939

Claims priority, application Sweden, Sept. 27, 1974, 74.121690

Int. Cl.² C23F *1/02*

U.S. Cl. 156—630 **9 Claims**

1. In a method for the production of through holes in a laminate used for printed wiring and consisting of an insulating base of glass fiber reinforced thermosetting resin provided on at least one side with a thin continuous layer of copper or copper alloy, comprising

electroplating said thin continuous layer of copper or copper alloy to a temporary base of a throwaway type comprising a foil of aluminum or an alloy thereof having a thickness of up to about 200 μm,

laminating said layer of copper or copper alloy on said temporary base under heat and pressure to a final base-

forming material consisting of at least one sheet of glass fiber reinforced thermosetting resin, and

subsequently drilling or punching holes in said laminate causing the formation of burrs in said layer of copper or copper alloy,

the improvement consisting of

dissolving said burrs and

removing the protective foil of aluminum or aluminum foil by etching, stripping, tearing off, or a combination thereof, leaving said thin electroplated layer of copper or copper alloy on the final base and the walls of the holes in said layer of copper or copper alloy being free of burrs.

4,023,999

FORMATION OF OPENINGS IN DIELECTRIC SHEET

Frank A. Lindberg, Baltimore; Stephen G. Konsowski, Glen Burnie; Maurice B. Shamash, and Seymour J. Ponemone, both of Randallstown, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 262,871, June 14, 1972, abandoned. This application Nov. 11, 1974, Ser. No. 522,959

Int. Cl.[2] H05K *1/14*

U.S. Cl. 156—652 **1 Claim**

1. The method of producing in a dielectric sheet, having at least one opening therethrough, at least a second opening in one surface thereof subtended by a metal cover on the opposite surface thereof and at least a third opening in said opposite surface of said sheet subtended by a metal cover on said one surface thereof, said first, second, and third opening being displaced from each other along said sheet, and in addition, providing a coating on the walls of said one opening between said one surface and said opposite surface; the said method comprising coating in a single operation both said surfaces of said sheet and also on the walls of said one opening, by producing substantially linear streams of vapor and rotating said sheet in said streams, depositing a photoresist coating on the metal coating on both surfaces of said sheet and on the coating on the walls of said one opening, producing images respectively on each of said photo-resist coating on the surfaces of said sheet, processing said images to remove photo-resist coating from each of said surfaces selectively as determined by said images, the image on the photo-resist coating on said one surface defining the area of said second opening, and the processing of said images exposing to etching only the metal in said last-named area, the image on the photo-resist coating on said opposite surface defining the area of said third opening, and the processing of said images exposing to etching only the metal in said last-named area, the image of said photo-resist coating on said one surface also defining the metal on said one surface which last-named metal subtends said exposed metal on said opposite surface and the processing of said images leaving said subtending metal protected from etching by photo-resist coating, and the image of said photo-resist coating on said opposite surface also defining the metal on said opposite surface, which last-named metal subtends said exposed metal on said one surface, and the processing of said images leaving said last-named subtending metal protected from etching by photo-resist coating, the processed photo-resist coating also protecting from etching the metal on the walls of said first opening, subjecting said imaged and processed sheet as a whole in a single operation to a first etchant to etch both the exposed metal in the area of said first opening and the exposed metal in the area of said second opening, said etchant etching only said last-named metals thereby exposing unetched the dielectric material in said areas, said subtending metal on said one surface and said subtending metal on said opposite surface remaining protected against etching respectively by said imaged and processed photo-resist coating on said one surface and by said imaged and processed photo-resist coating on said opposite surface, and, respectively, by said exposed dielectric material in said area on said opposite surface and by said exposed dielectric material in said area on said one surface, etching both said dielectric material in said area on said one surface and said dielectric material in said area on said opposite surface in a single operation with a second etchant to which said metal is resistant and which etches only said last-named dielectric material, and removing residual photo-resist, remaining after said imaging and processing and etching from both said surfaces, thereby providing an opening through said sheet whose walls are coated with metal connected between the metal on said one surface and the metal in said opposite surface, and second and third openings in said one surface and said opposite surface, each opening subtended by a metal cover respectively in said opposite surface and said one surface.

4,024,000

STABILIZATION OF β-AMYLASE IN AQUEOUS MEDIUM

Osamu Shibata, and Hitoshi Taniguchi, both of Sennan, Japan, assignors to Fuji Oil Company Ltd., Osaka, Japan

Filed Aug. 12, 1975, Ser. No. 603,811

Claims priority, application Japan, Aug. 13, 1974, 49-93046

Int. Cl.[2] C07G *7/02*

U.S. Cl. 195—63 **20 Claims**

11. A stabilized aqueous solution of β-amylase which comprises a divalent or trivalent metal compound selected from the group consisting of the hydroxides of calcium, magnesium, barium and aluminum and salts thereof with acids in a concentration of not less than about 0.01% by weight, said solution having a pH of about 4.5 to 8.0.

4,024,001

SMOKE FILTER PROCESS AND APPARATUS

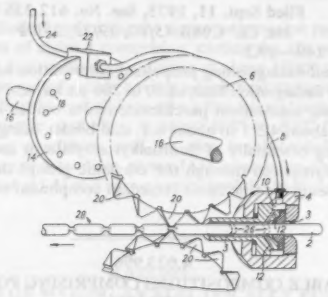
Henry Lyon, Bletchley, and Stanley William Byrne, Milton Keynes, both of England, assignors to American Filtrona Corporation, Richmond, Va.

Filed Sept. 12, 1975, Ser. No. 612,922

Claims priority, application United Kingdom, Sept. 19, 1974, 40953/74

Int. Cl.[2] A24C *5/50*

U.S. Cl. 156—180 **12 Claims**



1. A process for the continuous production of an elongate smoke filtering member having air-permeable deformations at longitudinally displaced positions along its length, which comprises continuously advancing longitudinally a rod-like body of a heat-activated bondable filtering material, intermittently passing a hot fluid laterally into the advancing body in an activating zone to activate the bondable filtering material substantially only at separate longitudinally displaced regions of the body while precluding the passage of the hot fluid into contact with the bondable filtering material at other regions, and deforming the outer surface of the advancing body at such regions where the bondable filtering material is activated.

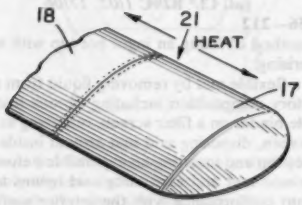
10. Apparatus for the continuous production of an elongate smoke filtering member having air-permeable deformations at longitudinally displaced positions along its length comprising means for continuously longitudinally advancing a rod-like body of heat-activated bondable filtering material, means defining an activating zone, means for passing a hot fluid laterally into the advancing body in said activating zone at regions longitudinally displaced along the body to activate the bondable filtering material substantially only at separate longitudinally displaced regions of the body while precluding the passage of the hot fluid into contact with the bondable filtering material at other regions, and means for deforming the outer surface of the advancing body at said regions where the bondable filtering material is activated.

4,024,002

METHOD AND PRODUCT FOR COVERING AIRCRAFT

William Gray Lott, Bakersfield, Calif., assignor to Eonair, Inc., Bakersfield, Calif.

Filed June 7, 1976, Ser. No. 693,305
Int. Cl.² B32B 31/00
U.S. Cl. 156—85 3 Claims



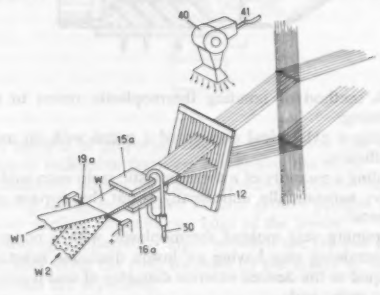
1. A method of covering aircraft including the successive steps of:
a. providing a heat shrinkable fabric;
b. impregnating said fabric to reduce its air permeability;
c. securing sections of the impregnated fabric to a frame portion of the aircraft; and,
d. heating said impregnated fabric while on said frame portion to shrink the same.

4,024,003

METHOD OF MAKING PILE FABRICS WITH DEFORMED PILE-THREAD ENDS

Hugo Bühler, Regensdorf, Switzerland, assignor to Patax Trust Reg., Schaan, Liechtenstein

Continuation-in-part of Ser. No. 415,373, March 14, 1974, abandoned. This application May 27, 1975, Ser. No. 581,167
Claims priority, application Switzerland, Mar. 15, 1973, 3854/73; Nov. 11, 1974, 15024/74
Int. Cl.² B32B 31/00
U.S. Cl. 156—148 15 Claims



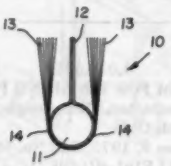
1. A method of making separable pile-type fastening fabrics, comprising the steps of forming two warp sheds from a plurality of warp threads of which at least some are meltable; preheating the warp threads to make them deformable; inserting weft threads into the respective sheds; beating up the inserted weft threads to form two superimposed fabrics which are connected by said meltable warp threads, and during such beating up both heating and adhering the weft threads and said meltable warp threads together; cooling the resulting fabrics to reverse the deformability of said meltable warp threads; and severing said meltable warp threads in a plane intermediate said fabrics by application of heat so as to obtain two fabrics each having a pile of meltable warp threads, while at the same time also deforming the severed ends of said meltable warp threads of said two fabrics so as to form such ends with terminal enlargements.

4,024,004

METHOD OF MAKING PILE WEATHERSTRIPPING

Jay C. Metzler, Pittsford, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.

Filed Dec. 26, 1974, Ser. No. 536,315
Int. Cl.² D02G 3/00
U.S. Cl. 156—169 2 Claims



1. A pile weatherstripping method comprising:
a. forming a plurality of continuous lengths of a resin anchorage base each having a cross-sectional shape for providing an interference fit in a retainer slot;
b. advancing said bases in parallel relation;
c. wrapping a multi-filament yarn continuously around said bases as they advance to enclose said bases within loops of said yarn;
d. securing said yarn to the outside of said wrapped bases along opposite sides of each of said bases;
e. slitting said yarn to separate said plurality of said wrapped bases and to provide each of said bases with a pair of insulating pile rows extending generally tangentially outward in the same general direction from each of said opposite sides of said bases; and
f. using said bases to anchor said weatherstrip in said retainer slot and press said pile rows against opposite sides of said retainer slot so said pair of pile rows extends outward from said retainer slot.

4,024,005

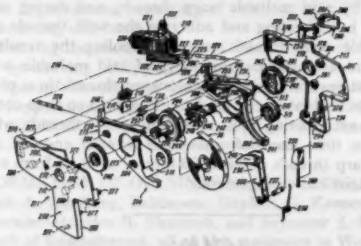
LABEL PRINTING AND APPLYING APPARATUS

William A. Jenkins, Englewood, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Continuation of Ser. No. 366,919, June 4, 1973, abandoned, which is a division of Ser. No. 206,061, Dec. 8, 1971, Pat. No. 3,783,083, which is a continuation-in-part of Ser. No. 155,740, June 23, 1971, abandoned. This application May 19, 1975, Ser. No. 578,831
The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.
Int. Cl.² B41F 1/02; B65C 11/02
U.S. Cl. 156—384 48 Claims

1. A hand-held portable label applying apparatus, comprising: a housing having a handle, means for delaminating pressure-sensitive labels from a web of supporting material, means disposed adjacent the delaminating means for applying the labels, a feed wheel engageable with the web for drawing the

web about the delaminating means, means for driving the feed wheel including a ratchet wheel, a drive pawl cooperable with the ratchet wheel, and a manually engageable actuator disposed at the handle for driving the pawl, and means including



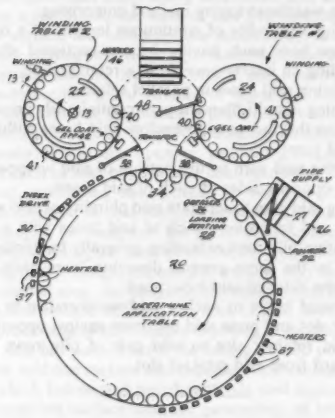
a plurality of teeth and including means cooperable with the teeth for varying the positional relationship of the ratchet wheel relative to the feed wheel to vary the position relative to the delaminating means to which the web is advanced by the feed wheel.

4,024,006

SYSTEM FOR FINISHING PIPES

Paul E. Gray, Gnadenhutten, Ohio, assignor to U.S. Concrete Pipe Co., Cleveland, Ohio

Filed June 9, 1975, Ser. No. 584,843
Int. Cl.² F16L 9/14; B31C 13/00
U.S. Cl. 156—172 **70 Claims**



1. A method of forming on first and second tables a fiberglass bell on one end of a non fiberglass pipe having straight ends and a collar on the other end comprising:

mounting a plurality of pipes vertically including mounting said pipes on a first table and grasping said pipes about the lower end thereof,

indexing said tables through a plurality of work stations,

pouring liquid material at one of said stations of said first table about said lower end of a mounted pipe to form said collar,

turning each said pipe end for end to an inverted vertical position after said collar is formed and with the end opposite said collar lowermost including transferring said pipes having collars to a second table, and

forming a fiberglass bell at one of the stations of said second table about said lower end including rotating said pipe, applying a gel to said lower end, helically winding a plurality of fiberglass strands about said lower end, and heating the wound bell to cure.

5. A system for forming a fiberglass bell on one end of a non fiberglass bell on one end of a non fiberglass pipe having straight ends and a collar on the other end comprising:

means for mounting a plurality of pipes vertically,

means for pouring liquid material about the lower end of a mounted pipe to form said collar,

means for turning each said pipe end for end to an inverted vertical position after said collar is formed and with the end opposite said collar lowermost, and

means for forming a fiberglass bell about said lower end including means for winding a plurality of fiberglass strands about said lower end.

4,024,007

LINING CAVITIES WITH HEAT INSULATING MATERIAL

Edward John Jago, and Kenton Parkes Cooley, both of Cleveland, Ohio, assignors to Foseco Trading A.G., Switzerland

Continuation of Ser. No. 851,052, Aug. 18, 1969, abandoned. This application Dec. 11, 1972, Ser. No. 314,026
Int. Cl.² B29C 1/02, 17/06
U.S. Cl. 156—212 **7 Claims**

1. The method of lining an ingot hot top with a preformed liner comprising:

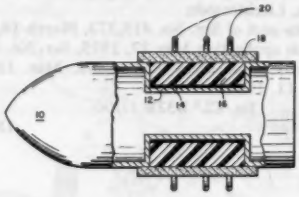
forming a flexible mat by removing liquid from a slurry of a refractory composition including fibrous material and a suitable binder on a filter screen, removing said mat from said screen, disposing said mat around inside surfaces of said hot top and inserting an expansible deforming means within said mat and expanding said means to press said mat into conformance with the interior surfaces of said hot top, removing said expansible deforming means, leaving said mat adhered within said hot-top thereby forming a lining and allowing said lining to harden in place.

4,024,008

PLASTIC TO METAL BONDING METHOD

Norman W. Gregornik, Brooklyn Center, and Dennis R. Pickering, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Sept. 7, 1976, Ser. No. 720,537
Int. Cl.² B29C 19/02, 19/00
U.S. Cl. 156—272 **14 Claims**



1. A method of bonding thermoplastic resins to metal, comprising:

coating a cylindrical portion of a metal with an uncured adhesive;

molding a quantity of a thermoplastic resin onto said adhesive substantially uniformally about the portion of said metal;

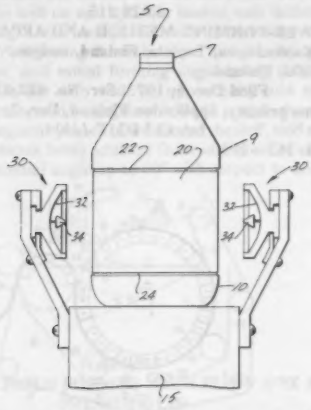
restraining said molded thermoplastic with a nonmetallic restraining ring having an inside diameter substantially equal to the desired exterior diameter of said thermoplastic resin; and

induction heating said metal for a time sufficient to cure said adhesive.

4,024,009
APPARATUS AND METHOD FOR WELDING A POLYETHYLENE SLEEVE LABEL TO A POLYETHYLENE BOTTLE

Donald L. Amsden, Toledo, and Casimir W. Nowicki, Sylvania, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 10, 1975, Ser. No. 548,541
Int. Cl.² B29C *19/02*; C09J *5/00*; G09F *3/00*
U.S. Cl. 156—272 6 Claims

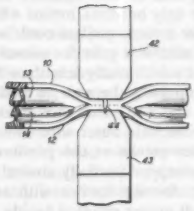


1. A method for attaching securely a polyethylene sleeve label to a polyethylene bottle having a neck, a body and a bottom, the method comprising the steps of:
   a. supporting said bottle, said bottle having a sleeve label located on the body thereof; and
   b. welding without the use of an adhesive the label to the bottle by heating with radiant heating, means spaced away from the label and the bottle to thereby prevent loss of the label.

4,024,010
OPEN PROFILE BAG

Salvatore Boccia, Blauvelt, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Filed May 15, 1975, Ser. No. 577,883
Int. Cl.² A41H *37/00*
U.S. Cl. 156—290 6 Claims

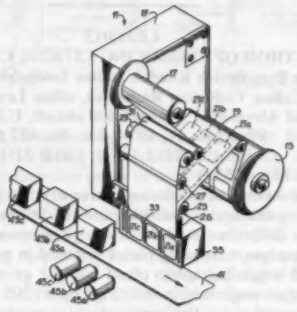


1. A method of preparing bags of thin plastic film having continuous reclosable fasteners comprising the steps:
   continuously advancing facing layers of plastic bag film having facing interlocked rib and groove profiles on the inner surface adjacent one edge of the layers;
   positioning a separating finger between the rib and groove profiles along the path traveled by the layers so that the profiles are separated;
   holding said rib and groove elements in exact opposing alignment while traveling over the separating finger;
   and immediately after the separating finger intermittently pressing the layers together transversely of their length at intervals determined by the width of the bags desired by pressing together sealing bars at a sealing location to press the profiles together into interlocking engagement and applying heat to form cross-seams on the layers.

4,024,011
LABEL APPLICATOR WITH REPETITIVE SEQUENTIAL FIRING ORDER AND METHOD

Michael Crankshaw, Santa Fe Springs; Leo Kucheck, Irvine, and Donald Lee Caudill, Riverside, all of Calif., assignors to Compac Corporation, Montebello, Calif.

Filed June 24, 1976, Ser. No. 699,264
Int. Cl.² B32B *31/10*
U.S. Cl. 156—299 16 Claims

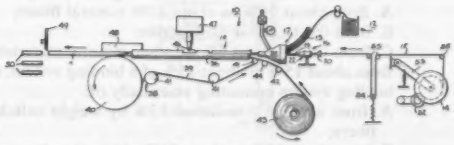


1. A label applicator for applying labels to articles which are moved in a first direction through a labeling station, said label applicator comprising:
   means for releasably retaining first and second of the labels in a row at the labelling station with the axis of the row extending generally in said first direction and with the first label being downstream, in the direction of article movement, of said second label;
   means for transferring the first and second labels from the retaining means to first and second of the articles, respectively, as the first and second articles are moved through the labelling station; and
   control means for controlling said transferring means so that said transferring means initiates transfer of the first label to the first article before initiating transfer of the second label to the second article.

4,024,012
METHOD AND APPARATUS FOR MAKING A HOLLOW FILTER AND A FILTER ROD

Ned A. Sigmon, Durham, N.C., assignor to Liggett & Myers Incorporated, Durham, N.C.

Continuation of Ser. No. 391,581, Aug. 27, 1973, abandoned. This application July 16, 1975, Ser. No. 596,471
Int. Cl.² B29H *9/00*
U.S. Cl. 156—441 10 Claims



1. An apparatus for making a filter rod for cigarette filter tips comprising
   first means for supplying a stream of tubing;

a mandrel having a passageway for passage of a supplied stream of tubing therethrough;

second means for supplying a stream of fibrous cigarette filter material

third means circumferentially enveloping said mandrel for directing a supplied stream of fibrous filter material circumferentially about said mandrel;

fourth means for supplying a stream of paper;

forming means circumferentially enveloping the delivery end of said mandrel and positioned downstream of said third means for receiving the supplied streams of tubing, filter material and paper, said forming means causing said filter material to frictionally engage said tube, and to circumferentially envelop the paper stream about juxtaposed streams of filter material and tubing to form a filter rod;

means for cutting said filter rod into predetermined lengths.

4,024,013

METHOD OF PRODUCING CITRINE CRYSTALS

Valentin Evstafievich Khadzhi, ulitsa Institutskaya, 14, kv. 8, and Galina Vasilievna Reshetova, ulitsa Lenina, 24, kv. 6, both of Alexandrov Vladimirskoi oblasti, U.S.S.R.

Filed Jan. 11, 1974, Ser. No. 432,650

Int. Cl.² B01J *17/04*; C01B *33/12*

U.S. Cl. 156—623 Q **3 Claims**

1. In a method of producing citrine crystals by growing said citrine crystals under hydrothermal conditions using the temperature difference method in a high-pressure autoclave on crystalline quartz seeding plates oriented in parallel with the pinacoid crystallographic plane {0001} or with planes inclined at an angle within the range up to 20° with respect to said pinacoid plane, the improvement comprising charging an autoclave with crystalline quartz from aqueous solutions of potassium carbonate having a concentration of 5–10 wt.%, said solutions containing iron which is introduced into said autoclave in the form of metallic iron in an amount of from 2 to 20 g per l. of the solution, along with a compound selected from the group consisting of nitrites and nitrates of alkali metals and potassium permanganate, said compound being introduced into said autoclave in an amount of from 1 to 20 g per l. of the solution to oxidize said metallic iron to trivalent iron, with said growing of the citrine crystals being conducted at a crystallization temperature of from 300° to 345° C, under a pressure of from 300 to 1500 kg/cm², and at a rate of from 0.2 to 1mm/day.

4,024,014

NON-COMBUSTIBLE HARDBOARD SHEET

David Wallace Akerson, St. Paul, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Dec. 15, 1975, Ser. No. 640,458

Int. Cl.² D21H *5/18*

U.S. Cl. 162—145 **7 Claims**

1. A process for producing a hardboard product having a fire rating of Class A according to ASTM Test E-84 comprising:

a. forming an aqueous slurry of solids and water said solids consisting essentially of the following ingredients:

i. from about 75% to about 85% by weight mineral material, said mineral material consisting essentially of:

A. from about 20% to about 85% mineral fibers;

B. from 0% to about 50% perlite;

C. from 0% to about 5% of other mineral materials;

ii. from about 15% to about 25% of a binding system, said binding system consisting essentially of:

A. from about 5% to about 15% by weight cellulosic fibers;

B. from about 10% to about 20% of a heat and moisture re-activatable binding agent;

b. forming a relatively light product by depositing the said aqueous slurry on a forming screen;

c. drying the said formed product to a moisture content of no greater than about 3% by weight;

d. applying to each side of the dried product from about seven pounds per thousand square feet to about fifteen pounds per thousand square feet of water;

e. simultaneously heating and pressing the formed product to reduce its thickness by a factor of at least 2.5 and to increase its density to at least 50 pounds per cubic foot.

4,024,015

WEB-FORMING METHOD AND APPARATUS

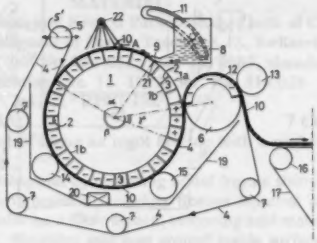
Matti Kankaanpaa, Tapiola, Finland, assignor to Valmet Oy, Helsinki, Finland

Filed Dec. 6, 1973, Ser. No. 422,412

Claims priority, application Finland, Dec. 7, 1972, 723461

Int. Cl.² D21F *11/04*

U.S. Cl. 162—203 **20 Claims**



10. In a web-forming apparatus, particularly adapted to form a cellulose web from a pulp slurry jet containing unbeaten cellulose fibers, rotary wire cylinder means for participating in the formation of a web at its exterior surface, said cylinder means having a diameter on the order of 2.5–5 meters a horizontal axis and over its axis at its uppermost part a crest situtated between opposed sides of said cylinder means which respectively travel upwardly toward and downwardly away from said crest while said cylinder means rotates around said axis in a given direction, headbox means having a slice situated at the upwardly traveling side of said cylinder means adjacent but spaced at least at a substantial angle in advance of said crest thereof for directing a pulp slurry jet onto said cylinder means at a velocity substantially greater than the peripheral velocity of said cylinder means to be carried thereby from said slice upwardly through and beyond said crest and then downwardly beyond the latter at the downwardly traveling side of said cylinder means, said headbox means being the only headbox means which cooperates with said wire cylinder means, endless outer wire means wrapped partially around said wire cylinder means through an angle of at least 180° but substantially less than 360° with respect to said axis for comprssing the web on said cylinder means between the latter and said outer wire means during rotation of said cylinder means, said outer wire means traveling together with said cylinder means at the portion of said outer wire means which is wrapped partially around said cylinder means to consitute a twin-wire former with said cylinder means, rotary pickup roll means situated beside said cylinder means at the upwardly traveling side thereof at a greater distance from said crest than said headbox means so that the latter is situated between said pickup roll means and said crest, said outer wire means extending from its portion which is wrapped partially around said cylinder means partially around said pickup roll means to be partially guided thereby while supporting the web upon separation from said cylinder means, means returning said outer wire means from said pickup roll means back to said cylinder means, said cylinder means being the only cylinder means which cooperates with said outer wire means, the compression of the web between said cylinder means and said endless outer wire means and the travel of the

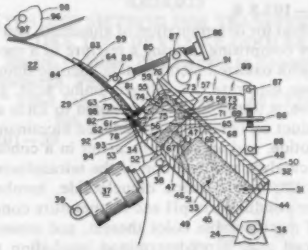
web around said axis both acting to provide a dewatering of the web directed outwardly away from said axis, suction means acting on said web situtated between said cylinder means and endless outer wire means for providing an inwardly directed dewatering of the web simultaneously with said outwardly directed dewatering thereof, means separating the web from said outer wire means at the region of said pickup roll means and for directing the web toward a press section, an initial forming angle being defined between said slice of said headbox means and the location where the outer wire means first engages the web on said cylinder means, said initial forming angle having a size around said axis of between 45° and 150°, means for subjecting the web at said initial forming angle only to suction, said initial forming angle being sufficiently great to provide the web with an opportunity and time to acquire a structure and strength which will enable the web to withstand subsequent phases of treatment thereof, said slice of said headbox means being situated from said crest at an angle from said substantial angle up to 60° with respect to said axis.

4,024,016

CYLINDER MOLD FORMER WITH FLOW BOX AND PRESSURE LID

John Herbert Gordon, Bradford, and Frank A. Duchnowski, Lawrence, both of Mass., assignors to J. H. Horne & Sons, Inc., Lawrence, Mass.

Filed Dec. 18, 1975, Ser. No. 642,132
Int. Cl.² D21F *1/04*
U.S. Cl. 162—214 **17 Claims**



11. The method of forming paper on a cylinder mold by means of a unitary flow box having a manifold tapered in the cross-machine direction and separated by an apertured plate from an explosion chamber, an upstanding imperforate planar baffle in said chamber, and spring leaf pressure lid with a cantilevered tip, which method comprises the steps of

directing influent stock along said tapered manifold and thence through relatively short apertures in said apertured plate directly into the explosion chamber of said flow box;

then impacting said stock in a direction normal to said upstanding imperforate planar baffle and then flowing said stock upwardly along said baffle and against a wall of the explosion chamber to impact said stock perpendicularly for a second time;

then flowing said stock through a narrow passage, for development of pressure shock; and

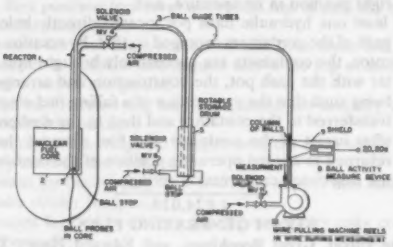
then flowing said stock through a divergent diffuser section to reform eddies and create turbulent mixing prior to delivering it through an outlet throat of the explosion chamber to said pressure lid for paper formation on said cylinder mold.

4,024,017

METHOD AND APPARATUS FOR MEASURING BURN-UP OF NUCLEAR FUEL IN A REACTOR

Carl M. Fleck, Goldegg-Gasse 1/13, A-1040 Vienna, Austria

Filed Aug. 27, 1974, Ser. No. 500,943
Claims priority, application Austria, Aug. 27, 1973, 7420/73; Jan. 15, 1974, 327/74
Int. Cl.² G21C *17/06*
U.S. Cl. 176—19 R **16 Claims**



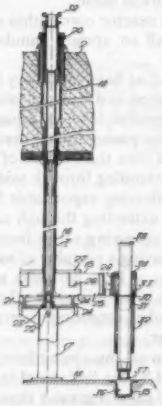
1. A method of measuring burn-up of nuclear fuel in a nuclear reactor including a core, comprising the steps of introducing a neutron flux probe of constant composition of at least two different nuclides which deliver two separable activities produced by two different neutron energies to a measuring point of the reactor core the burn-up of which is to be measured during operation of the reactor, the probe producing two measuring signals, each measuring signal being a function of the local flux of a different neutron energy changing with the burn-up at the measuring point, comparing the two signals and computing the burn-up on the basis of the comparison.

4,024,018

LIQUID METAL COOLED FAST BREEDER NUCLEAR REACTORS

Sidney Barnes, Warrington, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Nov. 25, 1974, Ser. No. 526,823
Claims priority, application United Kingdom, Dec. 6, 1973, 56703/73
Int. Cl.² G21C *19/00*
U.S. Cl. 176—30 **4 Claims**



1. A liquid metal cooled fast breeder nuclear reactor comprising:

a primary vessel containing a pool of coolant,

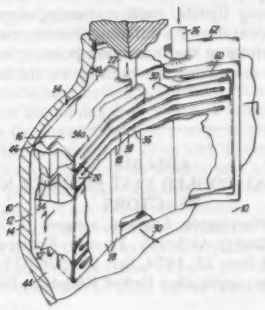
a reactor core submerged in the pool of coolant,
a transfer rotor submerged in the pool of coolant alongside the reactor core, the transfer rotor being rotatable about a vertical axis and having an annular series of apertures disposed about said axis,
a plurality of elongate thimble shape containers for receiving fuel assemblies disposed one in each of said apertures,
a plurality of helical coil compression springs mounted on and carried by said rotor each spring operatively engaging and elastically supporting one of said containers in upright position in its aperture, and
at least one hydraulic dash pot located directly below the path of the containers arranged so that, by rotation of the rotor, the containers are successively brought into register with the dash pot, the construction and arrangement being such that the momentum of a falling fuel element is transferred to the container and then to the dashpot, and after arrest of the container and fuel element they are returned to normal operating position of the container by the associated compression spring.

4,024,019

STEAM GENERATING PLANT

David Duval, Great Brookham, and Edward Henry Taylor, Reading, both of England, assignors to Foster Wheeler Corporation, Livingston, N.J.

Filed July 17, 1974, Ser. No. 489,315
Claims priority, application United Kingdom, July 17, 1973, 34100/73
Int. Cl.² G21C *19/28*
U.S. Cl. 176—65 **8 Claims**



1. An integral nuclear reactor comprising:
a. an upright cylindrical shell;
b. a central nuclear reactor core within said shell and defining with said shell an upright annular passage therebetween;
c. means for circulating heated primary fluid from said core through said passage and back to said core;
d. a bundle of serpentine tubes of equal length positioned within said annular passage, such that some of said tubes are closer to said core than others of said tubes;
e. an inlet header extending through said shell and joined to said tubes for delivering vaporizable liquid to said tubes;
f. an outlet header extending through said shell and joined to said tubes for receiving vapor from said tubes;
g. said tubes each having a plurality of substantially horizontal legs extending at least part way around said annular passage, said legs being joined by tube bends to complete said serpentine tubes extending from said inlet header to said outlet header;
wherein the portion of the circumference of said annular passage traversed by the horizontal legs of said tubes that are closer to said core is greater than the portion of said circumference traversed by the horizontal legs of said tubes that are further from said core so that the total length of each tube is substantially the same, and wherein the vaporizable liquid is heated in said tubes by indirect heat exchange with said heated primary fluid circulating substantially orthogonal to horizontal legs.

4,024,020

METHOD OF CELL CULTURE ON POLYACRYLONITRILE SURFACE

Stefan A. Weiss, Bowie, Md., and John H. Johnson, Kirkwood, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 15, 1975, Ser. No. 640,991
Int. Cl.² C12K *9/00*
U.S. Cl. 195—1.8 **8 Claims**

1. In a method for culture of the type of cells which grow attached to a surface, the improvement comprising fixing the cells to be cultivated to a polyacrylonitrile surface maintained in contact with a nutrient culture medium, said polyacrylonitrile comprising acrylonitrile with 0 to 15% by weight of comonomer.

4,024,021

DETERMINATION OF GLUTAMATE AND GLUTAMIC TRANSAMINASES

William S. Stavropoulos, Carmel, and Kenneth J. Acuff, Indianapolis, both of Ind., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 380,810, July 19, 1973, abandoned. This application May 9, 1975, Ser. No. 575,879
Int. Cl.² G01N *31/14*
U.S. Cl. 195—103.5 R **3 Claims**

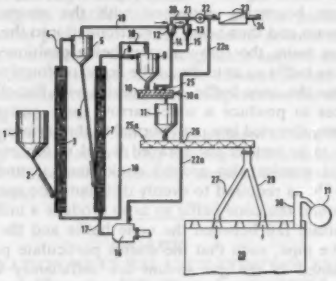
1. In a method for determination of glutamate and glutamic transaminases comprising forming a mixture of a specimen to be analyzed with oxidized nicotinamide adenine dinucleotide; a transaminase substrate, a substrate amino acid, glutamate dehydrogenase, a tetrazolium dye adapted to form a colored reaction product on reaction with reduced nicotinamide adenine dinucleotide, and an electron carrier in a concentration sufficient to catalyze said reaction of the tetrazolium dye and reduced nicotinamide adenine dinucleotide, incubating the mixture under conditions of pH and temperature conducive to formation of a measurable color therein, and measuring the color produced after a predetermined incubation time, the improvement wherein:
a. the specimen is mixed with a reagent substrate solution which has an ammonium ion concentration of less than about 0.001 molar; and which contains from about 0.0005 to about 0.005 moles of tetrazolium dye per liter, from about 2000 to about 40,000 International Units of glutamate dehydrogenase per liter; and from about 0.002 to about 0.004 moles oxidized nicotinamide adenine dinucleotide per liter, from about 250 to about 2000 International Units of diaphorase per liter, α-ketoglutarate in a concentration of from about 0.0005 to about 0.0012 moles per liter, and a substrate amino acid selected from the group consisting of L-alanine and L-aspartate in a concentration of from about 0.01 to about 0.5 moles per liter, and an aqueous buffer adapted to maintain a pH of from about 8.0 to about 8.2 of the substrate reagent solution; and wherein the color is measured after incubation of the resulting mixture of specimen and reagent substrate solution solution at a temperature of from about 35° to about 40° C., and a pH of from about 7.9 to about 8.3 for a predetermined time sufficient to develop a measurable color therein and less than about 15 minutes.

4,024,022

METHOD OF INHIBITING DUST FORMATION WHEN FEEDING COAL INTO COKING CHAMBERS

Heinrich Frühbuss, Essen, Germany, assignor to Bergwerksverband GmbH and Didier Engineering GmbH, both of Essen, Germany

Filed Dec. 2, 1975, Ser. No. 636,557
Claims priority, application Germany, Dec. 5, 1974, 2457528
Int. Cl.² C10B 53/00, 57/04
U.S. Cl. 201—23 8 Claims



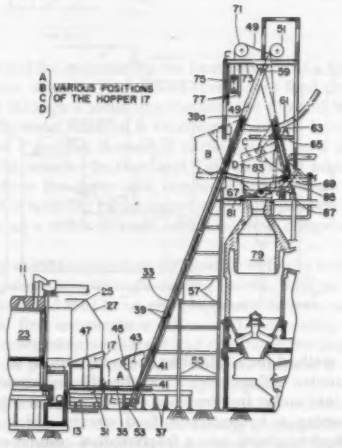
1. A method of inhibiting dust formation when feeding coal into a coking chamber, comprising preheating the coal to temperatures between about 150° and 250° C.; and contacting said preheated coal, prior to the introduction of the coal into the coking chamber, with about 0.5 to 5 percent by weight of used motor oil recovered from a motor vehicle.

4,024,023

APPARATUS AND METHOD FOR TRANSFERRING HOT COKE TO A DRY COKE COOLER

Albert G. Jonnet, Oakdale, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Feb. 13, 1976, Ser. No. 657,728
Int. Cl.² C10B 39/02, 39/12
U.S. Cl. 201—39 9 Claims



1. In apparatus for transferring hot coke pushed from a coke oven chamber of a coke oven battery into a dry coke cooler receptacle having a removable top closure, the improvement comprising:

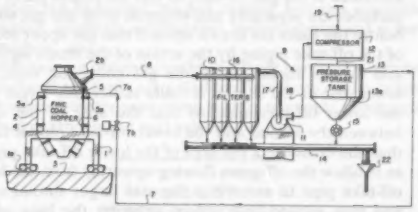
a. a car carrying a hopper thereon adapted to receive and hold hot coke discharged from said coke oven chamber;
b. means for moving said car alongside said battery;
c. means for moving said hopper off and away from said car and in a direction away from said battery;
d. a hoist track adjacent and upwardly inclined toward said dry coke cooler receptacle;
e. lifting means slidable on said track for coating with and supporting said hopper;
f. means for raising said lifting means and said hopper from a first position to a level above the top of said dry coke cooler receptacle;
g. means for pivoting a portion of said hoist track and said hopper to position said hopper above the top of said dry coke cooler receptacle;
h. means for removing said top closure on said dry coke cooler receptacle;
i. means for lowering said hopper onto the open top of said dry coke cooler receptacle;
j. means for discharging coke from said hopper into said dry coke cooler receptacle;
k. means for raising said hopper above said dry coke cooler receptacle;
l. means for replacing said top closure on said dry coke cooler receptacle;
m. means for pivoting the portion of said hoist track and said hopper to a position in alignment with the rest of said hoist track; and
n. means for lowering said hopper to said first position.

4,024,024

HOPPER FOR PREDRIED FINE COAL CARRIED ON HOPPER TRUCKS FOR COKING BATTERIES

Johannes Knappstein, Spanenkamp, Germany, assignor to Firma Carl Still, Germany

Filed Mar. 30, 1976, Ser. No. 671,834
Claims priority, application Germany, Apr. 10, 1975, 2515583
Int. Cl.² C10B 31/04
U.S. Cl. 202—262 9 Claims



1. An apparatus for supplying predried fine coal to individual ovens of a coke-oven battery, comprising a support truck adapted to be moved along the coke oven battery, a fine coal hopper mounted on said support truck and having a discharge for the discharge of the fine coal into the individual coke ovens, inert gas pressure storage means, an inert gas distributor located adjacent said hopper and connected into said hopper at spaced locations around its periphery and along its height and having means for discharging gas into said hopper at such locations, and connection means between said inert gas distributor and said inert gas pressure storage means permitting movement of said hopper with said support truck along the coke oven batteries.

4,024,025

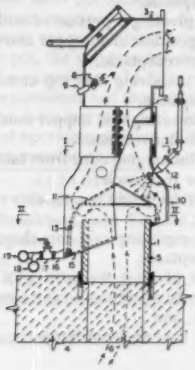
GAS CLEANING DEVICE FOR CONTROLLING AIR POLLUTION FROM THE CHARGING PORTS OF A BY-PRODUCT COKE OVEN AND FOR OBTAINING SUPERIOR QUALITY BY-PRODUCTS

A. Albert Biss, 1511 Atlas Road, Wheeling, W. Va. 26003

Continuation-in-part of Ser. No. 414,513, Nov. 9, 1973, abandoned. This application Mar. 26, 1975, Ser. No. 562,254

Int. Cl.[2] C10B 27/04

U.S. Cl. 202—263 3 Claims



1. In a by-product coke oven having charging ports for filling the coke oven with coal and having a vertical off-take pipe for collecting off-gases and smoke from a coke oven, the oven off-take pipe having upper and lower sections and including a steam aspirator in the upper section for aspirating the off-gases from the oven

the improvement comprising an air pollution control device for cleaning coarse particulate matter from the off-gases during the period when coal is being charged into the oven, the device adapted to permit sufficient aspiration pressure so that substantially all of the off-gases and smoke are drawn through the off-take pipe during the oven charging period thereby preventing the escape of off-gases and smoke through the charging ports to the atmosphere, the device comprising of a shroud, cone baffle, spray nozzles and scrubbant collection piping, and designed so as to charge the direction and velocity of the gases and wet the particulate matter, i.e., solid particles entrained in the gas, stream, so that the coarse particulate particles are separated and dropped from the gas stream before the gases are drawn upward into the upper section of the off-take piping by the action of the steam aspirator and thence discharged to the gas collection main; the lower part of the shroud is made sufficiently larger than the lower off-take pipe so that the area of the space between the shroud and the lower off-take pipe is larger than the cross-sectional area of the lower off-take pipe so as to allow the off-gases flowing upwardly from the lower off-take pipe to enter into the said larger shroud space and thus expand and reduce velocity; the base of the shroud, also being sloped so that the scrubbant liquid can effectively wash down the collected particulate matter; the upper part of the shroud being contoured so that the sides of the shroud and cone baffle are sloped in diverging directions so as to relieve the back pressure of the gas between the shroud and cone baffle, above the cone baffle and thus to increase the gas velocity and to produce a laminar flow of gases upwardly which will facilitate the aspiration of gas from the oven into the gas collection main during the oven charging period;

a cone baffle located sufficiently high above the lower off-take pipe so as to minimize gas pressure drop as the gases are deflected into the shroud area, the base diameter of the cone baffle being sized to form a smaller area or constriction between the cone baffle and the shroud than the area between the shroud and the lower off-take pipe so as to increase the gas velocity through the constriction and thence flowing upward, aided by the diverging slopes of the shroud and cone baffle; the cone baffle may be modified from that depicted in FIG. 2 depending on the overall height of the off-take piping providing, however, that the slope of the cone baffle diverges from the slope of the shroud and the cone baffle is high enough to confine the liquid spray on the side of the cone corresponding to the respective spray nozzle;

the liquid spray nozzles are located below and away from the steam aspirator so as to prevent the sprayed liquid from becoming entrained with the steam aspiration stream and thus being short circuited into the gas collection main; the spray nozzles being positioned near the cone baffle so as to direct the liquid uniformly distributed onto the cone baffle, said nozzles with flat elliptical orifices to produce a wide narrow spray pattern and the spray directed in a path normal to the surface of the cone so as to restrict the sprayed liquid to the cone surface, said nozzles also spaced equidistant around the cone baffle as required to evenly distribute the sprayed liquid around the cone baffle so as to produce a uniform liquid curtain fall between the cone baffle and the lower off-take pipe, such that the coarse particulate particles entrained in the gas stream are sufficiently wetted and forced to drop from the gas stream as the gas stream changes direction and velocity; the gases also passing through the upper sprays are further scrubbed of particulate matter;

thus, the shroud, cone baffle and spray nozzles working in conjunction with the steam aspirator, are a means for wetting the particulate matter and changing the direction and velocity of the gas stream so as to effectively scrub the coarse particulates from the oven off-gases during the oven charging period.

4,024,026

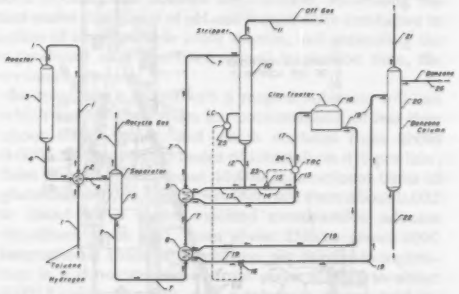
TEMPERATURE CONTROL OF INTEGRATED FRACTIONATION AND CLAYTREATING OF HYDROCARBONS

Steve A. Gewartowski, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Aug. 26, 1976, Ser. No. 717,978

Int. Cl.[2] B01D 3/42; C07C 7/04, 7/12

U.S. Cl. 203—2 7 Claims



1. A method for controlling the temperature of a fractionation column effluent stream as the effluent stream is being passed into a clay treating zone which comprises the steps of:

a. passing a hydrocarbon feed stream which comprises C_2–C_8 hydrocarbons into a fractionation column operated at effective fractionation conditions including a bottom temperature above a maximum desired inlet temperature of a downstream clay treating zone, and effecting the removal of C_2–C_5 hydrocarbons from the hydrocarbon feed stream by fractionation to thereby produce a fractionation column effluent

stream having a first temperature which is above an instantaneous preselected inlet temperature for the clay treating zone;

b. cooling the fractionation column effluent stream to a second temperature by dividing the fractionation column effluent stream into a first portion and a second portion, cooling the second portion by indirect heat exchange against the hydrocarbon feed stream, and then recombining the first portion and the second portion of the fractionation column effluent stream;

c. measuring the second temperature of the fractionation column effluent stream, and comparing the second temperature to the instantaneous preselected inlet temperature for the clay treating zone;

d. adjusting the relative flow rates of the first portion and the second portion of the fractionation column effluent stream in a manner which changes the second temperature of the fractionation column effluent stream to the instantaneous preselected inlet temperature for the clay treating zone; and,

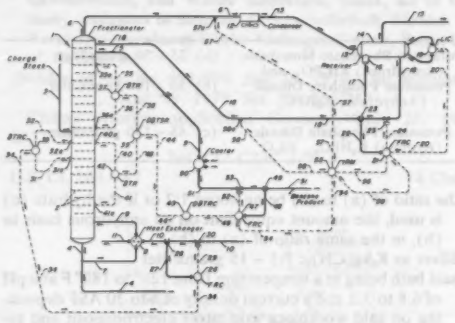
e. passing the fractionation column effluent stream through the clay treating zone at clay treating conditions including an inlet temperature within the range of from about 210° F. to about 425° F.

4,024,027

FRACTIONATION HEAT BALANCE CONTROL SYSTEM

David M. Boyd, Clarendon Hills, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 29, 1975, Ser. No. 644,989
Int. Cl.² B01D *3/42*
U.S. Cl. 203—2 **3 Claims**



2. A method for maintaining the heat balance of a fractionation column, wherein (i) a mixed-component feed stream is introduced through a locus intermediate the top and bottom; (ii) liquid bottoms material is recovered from the lower end, and at least a portion thereof is partially vaporized and returned to the reboiler section; and, (iii) overhead material is recovered from the upper end, condensed and at least a portion thereof is returned to the upper section of said fractionating column as a reflux stream, which method comprises the steps of:

a. sensing a first temperature differential between two vertically-spaced, temperature-sensing points, both of which are below said feed locus and proximate thereto, measuring said first temperature differential, generating a first signal representative thereof and regulating the degree to which the portion of said liquid bottoms material is vaporized in response to said first output signal;

b. sensing a second temperature differential between two vertically-spaced, temperature-sensing points below said feed locus, one of which is proximated to said feed locus and the second of which is proximate to the locus through which said partially-vaporized liquid bottoms material is returned, measuring said second temperature differential and generating a second signal representative thereof;

c. sensing a third differential between two vertically-spaced, temperature-sensing points above said feed locus, one of which is proximate thereto and the second of which is proximate to the locus through which said reflux stream is introduced, measuring said third temperature differential and generating a third signal representative thereof; and,

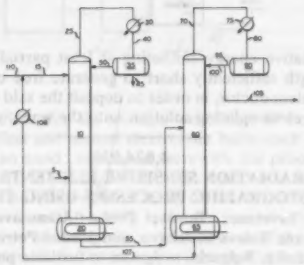
d. measuring the difference between said second and third temperature differentials, responsive to said second and third signals, generating a fourth signal representative of the resulting difference and regulating the quantity of said overhead material, returned to said upper portion of said fractionating column as the reflux stream, in response to said fourth signal.

4,024,028

EXTRACTIVE DISTILLATION OF HYDROCARBON MIXTURES

Donald M. Haskell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 8, 1976, Ser. No. 721,260
Int. Cl.² B01D *3/40; C07C 7/08, 11/16*
U.S. Cl. 203—51 **13 Claims**



1. A process for separation of a feed mixture of hydrocarbons having different degrees of unsaturation which comprises:

introducing the feed mixture and a selective solvent mixture comprising sulfolane, methylethylketone and dimethylsulfone into a fractionation zone having a top and a bottom and therein subjecting said mixtures to extractive distillation conditions including such pressure and corresponding temperature to separate the mixtures into a column overhead containing substantially all relatively saturated hydrocarbons and column bottoms containing mainly relatively unsaturated hydrocarbons and solvent mixture; and

withdrawing a column overhead stream containing substantially all relatively satruated hydrocarbons, and a column bottoms stream containing mainly relatively unsaturated hydrocarbons and said selective solvent.

4,024,029

ELECTRODEPOSITION

Norman Rain, and Arthur Basil Joseph Sullivan, both of Letchworth, England, assignors to National Research Development Corporation, London, England

Filed Oct. 16, 1975, Ser. No. 623,079
Claims priority, application United Kingdom, Oct. 17, 1974, 45081/74; Sept. 5, 1975, 36731/75
Int. Cl.² C25D *5/02, 5/54*
U.S. Cl. 204—15 **21 Claims**

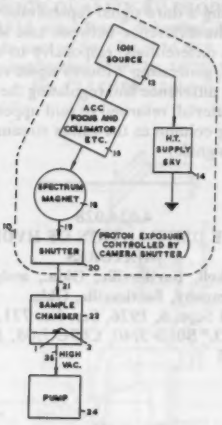
1. A method of depositing a material onto a semiconductor having a surface lattice structure including successive the steps of:

1. bombarding the semiconductor with a beam of ions to produce damage in the surface lattice structure,

2. immersing the semiconductor in an electroplating solu-

tion suitable for depositing the said material onto the semiconductor, and

3. supplying radiative energy to the semiconductor, the said



radiative energy consisting at least partially of a wavelength sufficiently short to generate free carriers in the semiconductor, in order to deposit the said material from the electroplating solution onto the semiconductor.

4,024,030
RADIATION SENSITIVE ELEMENTS AND PHOTOGRAPHIC PROCESSES USING THE SAME

Atanas Tzvetanov Burov; Penka Atanasova Simidjieva; Rumyana Toteva Stoicheva, and Jordan Petrov Malinovski, all of Sofia, Bulgaria, assignors to Institute po Phisikohimia pri Bulgarska Akademia na Naukite, Sofia, Bulgaria

Continuation-in-part of Ser. No. 271,406, July 13, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,972
Claims priority, application Bulgaria, July 30, 1971, 18203
Int. Cl.² G03C *5/24, 5/00, 1/76*
U.S. Cl. 204—15 **2 Claims**

1. Photographic material yielding on exposure to radiation a direct positive image capable of being intensified by means of an additional deposition of a metal, comprising:

a. a nonmetallic, catalytically inactive carrier on the surface of which has been introduced an intermediate layer consisting of an adhesive resin or a vacuum evaporated magnesium fluoride or chromium which intermediate layer provides sufficient adhesion of the metal layer deposited onto it to withstand subsequent processing and intensification and to ensure mechanical stability of the latent image, said adhesive resin being selected from the group consisting of butadiene acrylonitrile rubber, polyvinylcinnamate, polyacrylonitrile, and thermoplastic sodium butadiene adhesive;

b. a metal layer of at least one catalytically active metal nuclei deposited on said intermediate layer and selected from the group consisting of silver, tin, lead, copper, antimony, molybdenum, bismuth, zinc, cadmium, iron, nickel, chromium, or indium or combination thereof capable of catalyzing the process of intensification by additional deposition of a metal, and having a thickness corresponding to 10^{-7} to 10^{-4}g/cm², empirically established for each metal and for the corresponding processing and intensification;

c. a layer of at least one photosensitive substance on said metal layer and selected from the group consisting of a halide of silver, cadmium, lead, bismuth, thallium, zinc, copper, or mercury; a chalcogenide (sulphide, selenide, telluride, or oxide) of arsenic, lead, cadmium, zinc, or antimony; a vitreous chalcogenide semiconductor of the type As_xS_x, As_xS_3+S, $As_xS_xI_y$; or $As_xSe_xI_y$, where x has a value in the range from 1 to 7 and y has a value in the range from 0.1 to 2, with a thickness corresponding to 10^{-6} to 10^{-3} g/cm², empirically matched with the thickness of the metal layer and the chosen intensification process, the said photosensitive substance being selected so that on image-wise exposure to radiation in any region exposed to radiation the catalytic activity of the said metal layer relative to the process of intensification is destroyed, but in any region not so exposed the said catalytic activity of the metal layer remains intact, so that after processing by selective dissolution the direct positive metal image obtained is capable of catalyzing the selective deposition onto it of the same metal or another metal providig thereby an intensification of the primary image.

4,024,031
SILVER PLATING

Lewis Brian Lerner, Linglestown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 28, 1975, Ser. No. 625,975
Int. Cl.² C25D *3/48*
U.S. Cl. 204—46 R **23 Claims**

1. A process for depositing on a workpiece a silver electrodeposit from an electrolyzed silver plating bath comprising an aqueous solution of

Potassium Phosphate Monobasic (Anhydrous) KH_2PO_4, and	(a) 25 – 50 grams/liter
Potassium Phosphate Dibasic (Anhydrous) K_2HPO_4	(b) 50 – 100 grams/liter
or	
Potassium Phosphate Dibasic (Hydrate) $K_2HPO_4 . 3H_2O$	(c) 65 – 130 grams/liter

the ratio of (a) to (b) being about 1:2 or if the hydrate (c) is used, the amount equivalent on an anhydrous basis to (b), in the same ratio of (a) to (b)

Silver as $KAg[CN]_2$: 7.5 – 15 grams/liter

said bath being at a temperature from 120° to 180° F at a pH of 6.8 to 7.2 and a current density of 5 to 30 ASF depositing on said workpiece said silver electrodeposit and recovering said workpiece.

4,024,032
ELECTROCHEMICAL ACYLOXYLATION OF CERTAIN AROMATIC COMPOUNDS

Norman L. Weinberg, East Amherst, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,532
Int. Cl.² C25B *3/00, 3/10*
U.S. Cl. 204—59 R **35 Claims**

1. An electrochemical acyloxylation process comprising subjecting an anhydrous liquid comprising

a. an aromatic substrate comprising an aromatic nucleus ring-substituted with at least one electron-withdrawing moiety and having at least one replaceable nuclear hydrogen, and

b. an anion of strong carboxylic acid having a pK_a (H_2O) at 25 ° C value of less than about 3

to electrolytic conditions sufficient to effect nuclear acyloxylation of said aromatic substrate wherein an acyloxy group corresponding to said anion replaces said hydrogen.

4,024,033

PROCESS FOR PREPARING CYANOGEN HALIDES

Marinus Alfenaar, Schinnen, and Désiré J. N. Jadoul, Valkenburg (L), both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed May 21, 1974, Ser. No. 471,953

Claims priority, application Netherlands, May 21, 1973, 7307035

Int. Cl.² C25B *1/24, 1/26;* C01C *3/00*

U.S. Cl. 204—59 R 7 Claims

1. A process for preparing cyanogen chloride or cyanogen bromide in an electrolysis cell with cathode and anode chambers separated by a semi-permeable diaphragm, comprising reacting chloride or bromide ions in the anode chamber with hydrogen cyanide or a salt thereof by means of a direct current, wherein the current density of the anode is between 300 and 5000 A/m² wherein the pH value of the reaction medium in the anode chamber is lower than 4.

4,024,034

METHOD FOR OPERATING THE FURNACES OF AN ELECTROLYSIS PLANT

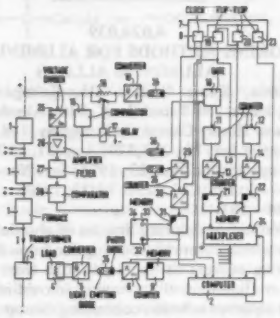
Christfried Döring, Langensendelbach; Johann Thomas, Erlangen; Manfred Volcker, Nuremberg; Völker Sparwald, Grevenbroich, and Walter Habersack, Stade, all of Germany, assignors to Siemens Aktiengesellschaft, Munich and Vereinigte Aluminum-Werke Aktiengesellschaft, Bonn, both of, Germany

Division of Ser. No. 491,699, July 25, 1974. This application Aug. 11, 1975, Ser. No. 605,253

Claims priority, application Germany, July 25, 1973, 2337797

Int. Cl.² C25C *3/06*

U.S. Cl. 204—67 14 Claims



1. In a method of operating an electrolysis plant which includes a plurality of furnaces, and in which the anode spacing of each furnace is controlled by a computer as a function of furnace resistance, said furnace resistance being calculated from furnace current and voltage, the improvement comprising selecting a desired furnace resistance and adjusting said desired resistance in response to the detection of a selected number of furnace voltage variations which exceed a specified voltage level, and, additionally, in response to the calculated furnace resistance, variations of the furnace resistance gradient, variations, of the rate of change of said gradient, and the difference between the expected furnace metal production with respect to long-term current yield and the measured furnace metal production.

4,024,035

METHOD FOR ELECTRIC EXTRACTION OF NON-FERROUS METALS FROM THEIR SOLUTIONS

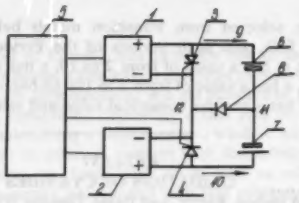
Ivan Dimitrov Enchev; Eliesser Persiado Ilel; Nikola Tzanov Kunchev; Kiril Georgiev Harizanov, all of Plovdiv; Vladimir Vetov Genevski, Sofia; Nedelcho Draganov Draganov, Plovdiv; Georgi Alexandrov Haralampiev, Sofia; Todor Ivanov Smilenov, Plovdiv; Yossif Genchev Stoyanov, Plovdiv, and Alexander Minchev Alexandrov, Plovdiv, all of Bulgaria, assignors to Nipki po Tzvetna Metalurgia, Plovdiv, Bulgaria

Filed July 7, 1975, Ser. No. 593,777

Claims priority, application Bulgaria, July 10, 1974, 27211

Int. Cl.² C25C *1/00;* C25D *5/18*

U.S. Cl. 204—105 R 2 Claims



1. In a process for the electric extraction of nonferrous metals from first and second electrolytic baths each having a cathode and an anode associated therewith, the process comprising the steps of passing an electric current in a first direction through the electrodes of each of the first and second baths to extract metal from the bath, and periodically reversing the direction of current flow through each of the baths to dissolve metal in the bath, the improvement which comprises the steps of serially connecting a pair of like electrodes of the first and second baths to a common point; passing, during a first interval, a pair of separate DC current flows symmetrically through the interconnected first and second baths in the first direction along paths individually including the respective other electrodes of the baths and the common point; passing, during a second interval following the first interval, a common serial flow of DC current simultaneously through the first bath in the first direction and the second bath in the reverse direction; and passing, during a third interval following the second interval, a common serial flow of DC current simultaneously through the second bath in the first direction and the first bath in the reverse direction.

4,024,036

PROTON PERMSELECTIVE SOLID-STATE MEMBER AND APPARATUS UTILIZING SAID PERMSELECTIVE MEMBER

Osamu Nakamura; Teruo Kodama, both of Ikeda; Isao Ogino, Minoo, and Yoshizo Miyake, Toyonaka, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Jan. 28, 1976, Ser. No. 653,219

Claims priority, application Japan, Feb. 3, 1975, 50-14553; Mar. 17, 1975, 50-32674; Mar. 17, 1975, 50-32675; Mar. 17, 1975, 50-32676

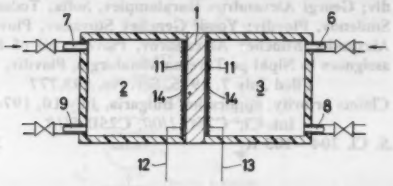
Int. Cl.² C25B *1/02;* H01M *6/18*

U.S. Cl. 204—129 13 Claims

1. A proton permselective solid-state member, formed by shaping at least one member selected from the group consisting of heteropoly acids represented by the generic formula:

$$H_m[X_xY_yO_z]\cdot nH_2O$$

wherein, X stands for at least one member selected from the group consisting of boron, aluminum, gallium, silicon, germanium, tin, phosphorus, arsenic, antimony, bismuth, selenium, tellurium, iodine and transition metals belonging to the fourth, fifth and sixth periods of the Periodic Table, Y is at least one



member selected from transition metals belonging to the fourth, fifth, and sixth periods of the Periodic Table, and wherein m has a value of from 2 to 10, y has a value of from 1 to 12, n has a value of from 3 to 100 all based on X taken as 1 and z has a positive numerical value and salts of said acids.

4,024,037

OXIDATION OF CYANIDES

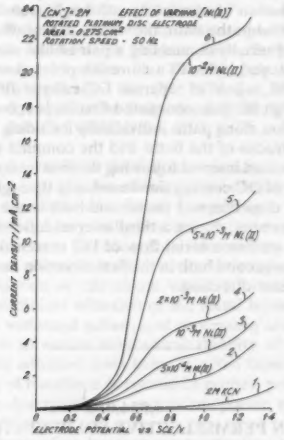
Edmund Bishop, Exeter, and David Timothy Wright, Edgware, both of England, assignors to National Research Development Corporation, London, England

Filed Feb. 10, 1976, Ser. No. 656,868

Claims priority, application United Kingdom, Feb. 18, 1975, 06801/75

Int. Cl.² C02B *1/82*; C02C *5/12*

U.S. Cl. 204—149 **9 Claims**



1. In a process for the removal of cyanide from cyanide-containing solutions by electrolytic oxidation of the solution, the improvement comprising adding nickel ions to the solution to enhance the rate of oxidation.

4,024,038

ADHESIVE PROCESSES

Jane Luc, 18 Rue Fourcroy, 75 Paris 17e, France

Continuation of Ser. No. 218,820, Jan. 18, 1972, abandoned, which is a continuation of Ser. No. 737,566, June 17, 1968, abandoned. This application Mar. 28, 1974, Ser. No. 455,911

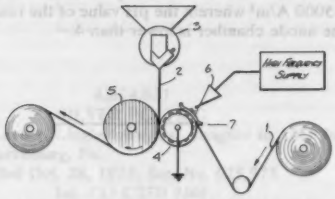
Int. Cl.² B01K *1/00*

U.S. Cl. 204—168 **11 Claims**

1. The method of imparting a predetermined area pattern of modified properties to sheet material while maintaining the integrity of the surfaces of the sheet material, comprising the steps of:

a. placing the sheet material contiguous with a pattern-defining member having an exposed surface and having an area configuration extending adjacent the exposed surface of the member and including a multiplicity of variations in predetermined properties of the member corresponding to an image of the area pattern which is to be imparted to the sheet material, the placing of the sheet material including positioning a surface of the sheet material in a juxtaposed relationship, contiguous with and facing the exposed surface of the pattern defining member and the area configuration thereof, and

b. subjecting the sheet material to a high level of energy directed at a surface of the sheet material which is opposite to and faces away from the surface of the sheet material contiguous with the pattern defining member, the high level of energy being focused by the area configuration on the sheet material, and being sufficient to affect the properties of the sheet material in the area pattern corresponding to the focused image of the area configuration of the pattern-defining member while maintaining the integrity of the surface of the sheet material, the high level of energy being insufficient to cause deformation or fusion of the sheet material subjected thereto, whereby the properties of the sheet material, including properties of both the surface of the sheet material contiguous with and facing away from the pattern-defining member, are modified in an area pattern corresponding to an image of the area configuration of the pattern-defining member.



4,024,039

COLORING METHODS FOR ALUMINUM AND ALUMINUM ALLOYS

Shoji Yoshida, Kobe; Yoshizo Ito, Kakogawa; Yoshihiro Sakasita, Kobe, and Tatsuhiko Kobata, Akashi, all of Japan, assignors to Honny Chemicals Company, Ltd., Kobe, Japan

Continuation of Ser. No. 285,220, Aug. 31, 1972, abandoned. This application Jan. 23, 1975, Ser. No. 543,417

Int. Cl.² C25D *11/22*, *13/06*

U.S. Cl. 204—181 **12 Claims**

1. In a method of coloring articles of aluminum and aluminum alloys which comprises passing for from 2 to 30 minutes an alternating current at up to 30 volts from the article of aluminum or aluminum alloys having an oxidized film thereon through an aqueous solution containing Group 8 metal salts at a temperature of from 5°–40° C. and then passing direct current at from 10–200 volts for from 0.5 to 10 minutes with the aluminum material article acting as an anode through an aqueous solution of electrolyte the improvement which comprises rendering said aqueous solution containing metal salts devoid of added acids and/or salts of metals thereof where they are other than Group 8 metals to form a uniformly colored article.

12. In a method of coloring articles of aluminum and aluminum alloys which comprises passing for from 2 to 30 minutes an alternating current at up to 30 volts from the article of aluminum or aluminum alloys having an oxidized film thereon through an aqueous solution containing group 8 metals salts at a temperature of from 5°–40° C. and then passing direct current at from 50–300 volts for from 0.5 to 5 minutes with the

aluminum material article acting as an anode through an aqueous solution of electrolyte containing a water-soluble resin having a temperature of from 10° to 30° C. and a pH of from 7.5 to 10.5, said electrolyte having a concentration of resin of from 3 to 4 wt.%, the improvement which comprises rendering said aqueous solution containing metal salts devoid of added acids and/or salts of metals thereof where they are other than Group 8 metals to form a uniformly colored article.

4,024,040

POLYMERIZATION OF UNSATURATED MONOMERS WITH RADIATION IN THE PRESENCE OF SALTS

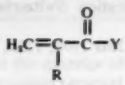
Charalambos J. Phalangas, Princeton Junction, N.J.; Alfred J. Restaino, Wilmington, Del., and Han Bo Yun, Trenton, N.J., assignors to Hercules Incorporated, Wilmington, Del.

Filed Feb. 26, 1974, Ser. No. 446,071

Int. Cl.² C08F *2/46, 4/00*

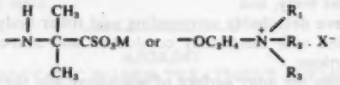
U.S. Cl. 204—159.22 **20 Claims**

1. A process for preparing a water-soluble, substantially linear, high molecular weight polymer which comprises irradiating an aqueous solution having a pH from about 2 to about 12 and containing from about 10% to about 40% by weight of: (a) an ethylenically unsaturated monomer having the formula (I)



(I),

(b) mixtures of monomers of formula (I), or (c) mixtures of at least one of the monomers of formula (I) with up to 50% by weight of an ethylenically unsaturated monomer selected from the group consisting of vinyl sulfonic acid, alkali metal salts of vinyl sulfonic acid, diacetone acrylamide, and mixtures thereof, provided that said mixture of monomers is water-soluble, wherein R represents hydrogen or methyl and Y represents $-NH_2$, $-OM$,



wherein M is hydrogen H_4N^+, alkali metal, or any other cation yielding a water-soluble, polymerizable compound, R_1, R_2, and R_3 are 1 to 4 carbon alkyl radicals and X is an anion, and containing at least about 3% by weight of a salt selected from the group consisting of potassium sulfate, potassium chloride, potassium fluoride, potassium bisulfate, tribasic potassium phosphate, dibasic potassium phosphate, monobasic potassium phosphate, sodium sulfate, sodium bisulfate, sodium chloride, tribasic sodium phosphate, dibasic sodium phosphate, monobasic sodium phosphate, lithium sulfate, lithium bisulfate, lithium chloride, ammonium sulfate, ammonium bisulfate, ammonium chloride, tribasic ammonium phosphate, dibasic ammonium phosphate, monobasic ammonium phosphate, ammonium fluoride, aluminum sulfate, aluminum chloride, and mixtures thereof, with high-energy ionizing radiation at an intensity of from 1,000 to 200,000 rads per hour to a total radiation dose of from about 1,000 to about 30,000 rads, to form an aqueous solution of a water-soluble, substantially linear, high molecular weight polymer, provided that when the aqueous solution contains at least 3% by weight of a water-soluble salt selected from the group consisting of aluminum sulfate, aluminum chloride, and mixtures thereof, the unsaturated monomer consists of from 5% to 100% of cationic monomer and from 95% to 0% nonionic monomer, and the aqueous solution has a pH from about 2 to about 5, and provided that the aqueous solution has a pH of from about 7 to about 9 when the water-soluble salt is an ammonium salt.

4,024,041

METHOD OF FORMING DEPOSITION FILMS FOR USE IN MULTI-LAYER METALLIZATION

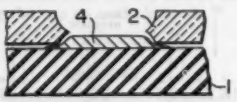
Masanobu Hanazono; Osamu Asai, and Katsumi Tamura, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 16, 1975, Ser. No. 641,299

Claims priority, application Japan, Dec. 18, 1974, 49-144500; Dec. 18, 1974, 49-144501

Int. Cl.² C23C *15/00*

U.S. Cl. 204—192 C **9 Claims**



1. A method of forming thin films for use in multi-layer metallization wherein a film having a desired pattern is formed on a substrate by glow discharge in a gas pressure of 10^{-1} Torr to 10^{-3} Torr, comprising depositing a thin film on the substrate while maintaining a mask having a window forming the desired pattern in intimate contact with the substrate, said mask comprising an elastic layer on at least an edge of its surface which comes into contact with said substrate.

4,024,042

ENZYME ELECTRODE

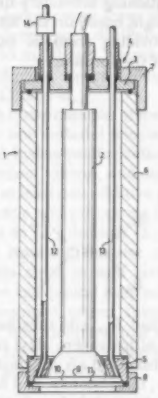
Sven Olof Enfors; Nils Ludvig Molin, both of Lund; Klaus Hermann Mosbach, Furulunds Station, and Hans Jorgen Nilsson, Lund, all of Sweden, assignors to Servo Chem AB, Vallingby, Sweden

Filed Mar. 17, 1976, Ser. No. 667,864

Claims priority, application Sweden, Mar. 27, 1975, 7503652

Int. Cl.² G01N *27/46*; C12K *1/04*

U.S. Cl. 204—195 P **5 Claims**

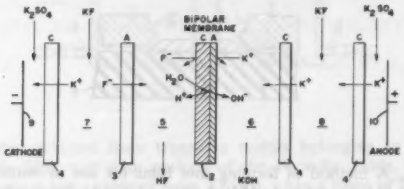


1. An enzyme electrode which can be sterilized and regenerated, comprising a detecting electrode having a sensitive surface and an enzyme in direct or indirect contact with the same, characterized in that a semi-permeable membrane is arranged at a distance from the sensitive surface of the detecting electrode and defines a chamber containing the enzyme and that a supply conduit and a discharge conduit are arranged for the supply and discharge of the enzyme, said supply conduit including a sterilization device for the enzyme.

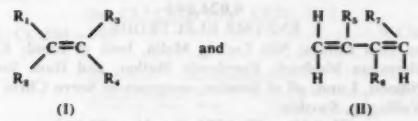
4,024,043
SINGLE FILM, HIGH PERFORMANCE BIPOLAR MEMBRANE

Gerald J. Dege, Parsippany, and Kang-Jen Liu, Somerville, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Dec. 31, 1975, Ser. No. 645,848
Int. Cl.² C25B *13/08*
U.S. Cl. 204—296 11 Claims

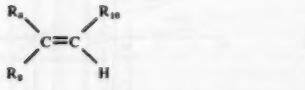


1. A single film bipolar polymeric membrane, having an ion selectivity above 80% in an electrolyte medium of at least 0.1 molar, derived from monomers selected from the group consisting of



(I) (II)

wherein R_1 to R_7 are substituents selected from the group consisting of hydrogen, chlorine, fluorine, alkyl radicals of 1 to 5 carbon atoms and phenyl radicals and copolymers thereof, and chlorinated and fluorinated polymers and copolymers thereof containing intimately dispersed therein at least 15 percent by weight based on the total weight of membrane, of a polymer providing aromatic nuclei and comprised of monomer units of the formula



(III)

wherein R_8, R_9 and R_{10} are substituents selected from the group consisting of hydrogen, alkyl radicals of 1 to 4 carbon atoms, phenyl substituted alkyl radicals of 2–4 carbon atoms, phenyl, phenoxy-, thiophenoxy, and naphthyl radicals and the hydroxyl-, alkoxyl-, and halo-substituted phenyl, phenoxy, thiophenoxy, and naphthyl radicals, and wherein at least one substituent of (III) is an aromatic radical, said membrane being cross-linked to a degree equivalent to that obtained by a 2 to 20 weight percent mixture of a commercial 55 percent divinyl benzene in styrene, and wherein about 50–98 percent of the membranes cross-section has highly dissociable cation exchange groups chemically bonded to the aromatic nuclei from one side only and having from about 2–50%, highly dissociable anionic exchange groups chemically bonded to the aromatic nuclei on the opposite side of said film.

4,024,044
ELECTROLYSIS CATHODES BEARING A MELT-SPRAYED AND LEACHED NICKEL OR COBALT COATING

James R. Brannan, Painesville, and Irving Malkin, University Heights, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Sept. 15, 1975, Ser. No. 613,576
Int. Cl.² C25B *11/06*; B23P *3/00*
U.S. Cl. 204—242 11 Claims

1. A cathode for the electrolysis of water or an aqueous alkali metal halide solution which comprises an electrically conductive substrate bearing on at least part of its surface a coating produced by melt spraying an admixtutre consisting essentially of particulate nickel, cobalt, or mixtures thereof, and particulate aluminum; and leaching out the aluminum from the melt-sprayed coating; said coating, before leaching, being substantially devoid of X-ray-detectable Raney metal alloy formed from melt spraying the particulate nickel or cobalt and particulate aluminum.

4,024,045
MASTER PATTERN CYLINDER

Hans Thierstein, Wiler b. Utzenstorf, Switzerland, assignor to Fritz Buser AG Maschinenfabrik, Switzerland

Filed Mar. 4, 1976, Ser. No. 663,761
Claims priority, application Switzerland, Mar. 6, 1975, 2815/75
Int. Cl.² C25D *1/08, 1/20, 17/00*
U.S. Cl. 204—281 6 Claims

1. A matrix usable for producing perforated nickel sleeves by electrolytic deposition, said matrix comprising:
a roller body; and
a sleeve detachably surrounding said roller body and provided with electrically conductive and non-conductive portions:
whereby the inner surface of said sleeve and the surface of said roller body form an adhesive, but non-destructive detachable surface support.

4,024,046
METHOD FOR MAKING POLYIMIDE COATED CONDUCTORS IN A CONTINUOUS MANNER AND PRODUCTS MADE THEREBY

John H. Lupinski, Scotia, N.Y., and James M. McQuade, Fort Wayne, Ind., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 497,516, Aug. 15, 1974, Pat. No. 3,974,324. This application June 20, 1975, Ser. No. 588,637
Int. Cl.² C25D *13/16, 13/06, 13/24*
U.S. Cl. 204—300 EC 2 Claims

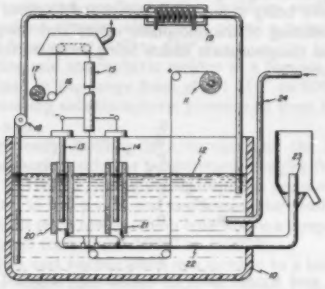
1. An apparatus for continuously effecting the electrodeposition of a polyamide acid onto a continuously moving electroconducting substrate comprising,
A. a tank for containing polyamide acid electrocoating mixture
B. an anode comprising:
1. electroconducting substrate
2. means for continuously conveying said electroconducting substrate into and out of said tank at a substantially uniform rate, while effecting contact with said electrocoating mixture
C. a cathode compartment comprising:
1. at least 1 semi-permeable membrane

a. said semi-permeable membrane allowing for solvent and base transfer from said electrocoating mixture into said cathode compartment through the wall of said semipermeable membrane, while resisting the flow of said polyamide acid into said cathode compartment

2. cathode disposed within said semipermeable membrane

3. a solvent and base removal means

a. said solvent and base removal means being impermeable to said electrocoating mixture and integrally joining said semi-permeable membrane to an over-



flow tube at the exterior of said tank of (A) permitting the automatic removal of solvent and base from the interior of said cathode compartment, whenever the level of liquid within said cathode compartment exceeds the overflow level of said exterior overflow tube,

D. means for introducing make up polyamide acid mixture into the tank

E. a thermal control means for maintaining the temperature of the bath

F. a curing tower for converting electrodeposited polyamide acid in said continuously moving conductor to the polyimide state.

4,024,047

ELECTROSTATIC WATER TREATMENT APPARATUS

David C. Clark; Louis H. Silverman, and John K. Barnard, all of Erie, Pa., assignors to Progressive Equipment Corporation, Erie, Pa.

Filed Jan. 20, 1976, Ser. No. 650,673
Int. Cl.² B03C *5/02*
U.S. Cl. 204—302 **11 Claims**

1. An electrostatic water treatment apparatus comprising a hollow electrode adapted to be immersed in the water to be treated, an impervious dielectric coating on the exterior of the electrode insulating the electrode from the water, an end cap having at least a portion of its exterior surfaces adapted to be immersed in the water to be treated for preventing leakage of water into one end of said electrode, said end cap having walls telescoped over the dielectric coating on said end of the electrode, an O-ring groove in said walls, an O-ring in said groove having one side subject to water pressure for compressing the O-ring against the groove and the dielectric coating for preventing leakage of water into the interior of the electrode, a passageway leading to the atmosphere through the end cap and the hollow electrode from the dry side of the O-ring, and means for holding the cap on said electrode.

4,024,048

ORGANOPHOSPHOROUS ANTIFOULANTS IN HYDRODESULFURIZATION

Don C. Shell, Richmond, and Edward C. Hayward, Houston, both of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 539,227, Jan. 7, 1975, abandoned. This application Nov. 20, 1975, Ser. No. 633,956
Int. Cl.² C10G *9/16*; C10L *1/26*; C23F *14/02*; B01D *3/34*
U.S. Cl. 208—48 AA **12 Claims**

1. In a method for reducing fouling of surfaces contacted with hydrodesulfurization feedstocks during hydrodesulfurization thereof without adversely affecting hydrodesulfurization catalysts, said hydrodesulfurization comprising a successive series of continuously practiced steps including:

A. heating a hydrodesulfurization feedstock to a temperature in the range from about 200° to 700° F,

B. admixing with said feedstock a source of hydrogen gas so as to produce a product mixture initially comprised of from about 0.1 to 1.0 parts by weight of hydrogen per 100 parts by weight of said feedstock,

C. subjecting said mixture simultaneously to a pressure of from about 400 to 500 psig and a temperature in the range from about 650° to 700° F, while contacting said mixture with a hydrodesulfurization catalyst,

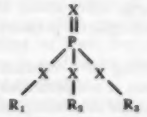
D. exposing the product system to a least one flashing zone such that the pressure thereof is reduced to a value ranging from about 10 to 50 psig and separating the resulting gas phase from the resulting liquid phase, and

E. fractionally distilling said resulting liquid phase using an initial liquid phase temperature from about 200° to 350° F and maintaining during such distillation pressure in the range from about 10 to 50 psig, thereby to remove from said resulting liquid phase lower boiling fractions developed during step (C) above,

the improvement which comprises the steps of:

a. admixing at least one material selected from the group consisting of said hydrodesulfurization feedstock, said mixture, said product system, and said liquid phase, a small amount of at least one additive preceding at least one of the respective said processing steps in said series designated above as (A) through (E) and thereafter

b. subjecting said resulting mixture to the remaining successive process steps in said series, said additive being at least one compound selected from the group consisting of phosphate esters, thiophosphate esters, phosphite esters, and thiophosphite esters, said phosphate esters and said thiophosphate esters being characterized by the general formula

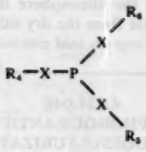


where:

X is sulfur or oxygen

R_1, R_2, and R_3 are each independently selected from the

group consisting of hydrogen, and addition complex of hydrogen with an amine, alkyl, aryl, alkaryl, cycloalkyl, alkenyl, and aralkyl provided that in any given such phosphate ester at least one and not more than two of each of R_1, R_2 and R_3 are hydrogen or an addition complex of hydrogen with an amine, and said phosphite esters and said thiophosphite esters being characterized by the general formula



where:

X is sulfur or oxygen

R_4, R_5, and R_6 are each independently selected from the group consisting of hydrogen, an addition complex of hydrogen with an amine, alkyl, aryl, alkaryl, cycloalkyl, alkenyl, and aralkyl, provided that in any given such phosphite ester at least one and not more than two of each of R_4, R_5, and R_6 are each hydrogen or an addition complex of hydrogen with an amine.

4,024,049

MONO AND DI ORGANOPHOSPHITE ESTERS AS CRUDE OIL ANTIFOULANTS

Don C. Shell, Richmond, and Edward C. Hayward, Houston, both of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 539,227, Jan. 7, 1975, abandoned. This application Nov. 20, 1975, Ser. No. 633,934

Int. Cl.² C10G *9/16;* C10L *1/26;* C23F *14/02;* B01D *3/34*

U.S. Cl. 208—48 AA **10 Claims**

1. In a method for reducing fouling of surfaces contacted with crude oils and residual crude oils during refinery processing thereof, said refinery processing comprising a successive series of continuously practiced steps including:

A. heating a crude oil in a heat exchanger to a temperature in the range from about 100° to 200° F.,

B. desalting said crude oil by the substeps of

1. turbulently mixing with the so heated crude oil from about 3 to 8 parts by weight of water for each 100 parts by weight of said crude oil,

2. breaking said emulsion, and

3. separating the resulting aqueous phase from the resulting crude oil phase,

C. further heating said resulting crude oil in a post desalter heat exchanger to a temperature in the range from about 200° to 500° F.,

D. still further heating said resulting crude oil in a furnace to a temperature in the range from about 500° to 700° F.,

E. fractionally distilling in an atmospheric still, the so heated, crude oil at temperatures ranging from about 300° to 650° F. and at pressures ranging from and including atmospheric up to about psia. and condensing the distillates until an atmospheric residue remains which boils above a temperature in the range from about 300° to 650° F.,

F. heating said atmospheric residue in a furnace to a temperature in the range from about 650° to 800° F while maintaining subatmospheric pressure of from about 5 to 14 p.s.i.a.,

G. fractionally distilling in a vacuum still the so heated atmospheric residue at temperatures ranging from about 800° to 1000° F, under subatmospheric pressures of from about 1 to 5 p.s.i.a. and condensing the distillates until a viscous pitch results which boils above a temperature in the range from about 1 to 5 p.s.i.a. results, p1 H. heating said viscous pitch in a furnace to a temperature in the range from about 1000° to 1500° F at subatmospheric pressures of from about 1 to 5 p.s.i.a. and

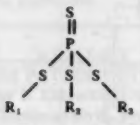
I. passing said so heated pitch into a flash zone maintained at a temperature in the range from about 860° to 900° F at pressures ranging from about 50 to 350 p.s.i.g.,

the improvement which comprises the steps of:

a. admixing with at least one material selected from the group consisting of said crude oil, said atmospheric residue, and said viscous pitch a small amount of at least one additive preceding at least one of the respective and processing steps in said series designated above as (A) through (I), and thereafter

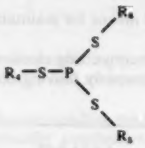
b. subjecting said resulting mixture to the remaining successive processing step(s) in said series,

said additive being at least one compound selected from the group consisting of thiophosphate esters and thiophosphite esters, said thiophosphate esters being characterized by the general formula



where:

R_1, R_2, and R_3 are each independently selected from the group consisting of hydrogen, an addition complex of hydrogen with an amine, alkyl, aryl, alkaryl, aycloalkyl, alkenyl, and aralkyl, provided that in any given such phosphate ester at least one and not more than two of each of R_1, R_2 and R_3 are each hydrogen or an addition complex of hydrogen with an amine, and said thiophosphite esters being characterized by the general formula



where:

R_4, R_5 and R_6 are each independently selected from the group consisting of hydrogen, an addition complex of hydrogen with an amine, alkyl, aryl, alkaryl, cycloalkyl, alkenyl, and aralkyl, provided that in any given such phosphite ester at least one and not more than two of each of R_4, R_5, and R_6 are each hydrogen or an addition complex of hydrogen with an amine.

4,024,050

PHOSPHOROUS ESTER ANTIFOULANTS IN CRUDE OIL REFINING

Don C. Shell, Richmond, and Edward C. Hayward, Houston, both of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 539,227, Jan. 7, 1975, abandoned. This application Oct. 23, 1975, Ser. No. 625,173

Int. Cl.² C10G *9/16;* C10L *1/26;* C23F *14/02;* B01D *3/34*

U.S. Cl. 208—48 AA **11 Claims**

1. In a method for reducing fouling of surfaces contacted with crude oils and residual crude oils during refinery processing thereof, said refinery processing comprising a successive series of continuously practiced steps including:

A. heating a crude oil in a heat exchanger to a temperature in the range from about 100° to 200° F.,

B. desalting said crude oil by the substeps of

1. turbulently mixing with the so heated crude oil from

about 3 to 8 parts by weight of water for each 100 parts by weight of said crude oil,

2. breaking said emulsion, and

3. separating the resulting aqueous phase from the resulting crude oil phase,

C. further heating said resulting crude oil in a post desalter heat exchanger to a temperature in the range from about 200° to 500° F.,

D. still further heating said resulting crude oil in a furnace to a temperature in the range from about 500° to 700° F.,

E. fractionally distilling in an atmospheric still, the so heated, crude oil at temperatures ranging from about 300° to 650° F. and

at pressures ranging from and including atmospheric up to about 50 psia. and condensing the distillates until an atmospheric residue remains which boils above a temperature in the range from about 300° to 650° F.,

F. heating said atmospheric residue in a furnace to a temperature in the range from about 650° to 800° F while maintaining subatmospheric pressure of from about 5 to 14 p.s.i.a.,

G. fractionally distilling in a vacuum still the so heated atmospheric residue at temperatures ranging from about 800° to 1000° F, under subatmospheric pressure of from about 1 to 5 to p.s.i.a. and condensing the distillates until a viscous pitch results which boils above a temperature in the range from about 1000° to 1500° F,

H. heating said viscous pitch in a furnace to a temperature in the range from about 1000° to 1500° F at subatmospheric pressures of from about 1 to 5 p.s.i.a. and

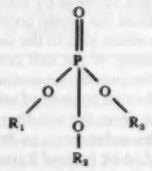
I. passing said so heated pitch into a flash zone maintained at a temperature in the range from about 860° to 900° F at pressures ranging from about 50 to 350 p.s.i.g.,

the improvement which comprises the steps of:

a. admixing with at least one material selected from the group consisting of said crude oil, said atmospheric residue, and said viscous pitch a small amount of at least one additive preceding at least one of the respective and processing steps in said series designated above as (A) through (I), and thereafter

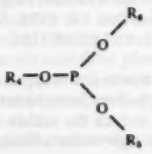
b. subjecting such resulting mixture to the remaining successive processing step(s) in said series,

said additive being at least one compound selected from the group consisting of phosphate esters and phosphite esters, said phosphate esters being characterized by the general formula



where:

R_1, R_2, and R_3 are each independently selected from the group consisting of hydrogen, an addition complex of hydrogen with an amine, alkyl, aryl, alkaryl, cycloalkyl, alkenyl, and aralkyl, provided that in any given such phosphate ester at least one and not more than two of each of R_1, R_2 and R_3 are each hydrogen or an addition complex of hydrogen with an amine, and said phosphite esters being characterized by the general formula



where:

R_4, R_5 and R_6 are each independently selected from the group consisting of hydrogen, an addition complex of hydrogen with an amine, alkly, aryl, alkaryl, cycloalkyl, alkenyl, and aralkyl, provided that in any given such phosphite ester at least one and not more than two of each of R_4, R_5, and R_6 are each hydrogen or an addition complex of hydrogen with an amine.

4,024,051

USING AN ANTIFOULANT IN A CRUDE OIL HEATING PROCESS

Don C. Shell, Richmond, and Edward C. Hayward, Houston, both of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 539,227, Jan. 7, 1975, abandoned. This application Nov. 20, 1975, Ser. No. 633,933

Int. Cl.² C10G 7/00

U.S. Cl. 208—348 **7 Claims**

1. In a method for reducing fouling of surfaces contacted with crude oils and residual crude oils during refinery processing thereof, said refinery processing comprising a successive series of continuously practiced steps including:

A. heating a crude oil in a heat exchanger to a temperature in the range from about 100° to 200° F.,

B. desalting said crude oil by the substeps of

1. turbulently mixing with the so heated crude oil from about 3 to 8 parts by weight of water for each 100 parts by weight of said crude oil,

2. breaking said emulsion, and

3. separating the resulting aqueous phase from the resulting crude oil phase,

C. further heating said resulting crude oil in a post desalter heat exchanger to a temperature in the range from about 200° to 500° F.,

D. still further heating said resulting crude oil in a furnace to a temperature in the range from about 500° to 700°F.,

E. fractionally distilling in an atmospheric still, the so heated, crude oil at temperatures ranging from about 300° to 650° F. and at pressures ranging from and including atmospheric up to about 40 psia. and condensing the distillates until an atmospheric residue remains which boils above a temperature in the range from about 300° to 650° F.,

F. heating said atmospheric residue in a furnace to a temperature in the range from about 650° to 800° F while maintaining subatmospheric pressure of from about 5 to 14 psia.,

G. fractionally distilling in a vacuum still the so heated atmospheric residue at temperatures ranging from about 800° to 1000° F, under subatmospheric pressures of from about 1 to 5 psia and condensing the distillates until a viscous pitch results

H. heating said viscous pitch in a furnace to a temperature in the range from about 1000° to 1500° F at subatmospheric pressures of from about 1 to 5 psia and

I. passsing said so heated pitch into a flash zone maintained at a temperature in the range from about 860° to 900° F at pressures ranging from about 50 to 350 psig.,

the improvement which comprises the steps of:

a. admixing with at least one material selected from the group consisting of said crude oil, said atmospheric residue, and said viscous pitch a small amount of at least one additive preceding at least one of the respective and processing steps in said series designated above as (A) through (I), and thereafter

b. subjecting such resulting mixture to the remaining successive processing step(s) in said series,

said additive being at least one compound selected from the group consisting of amine salts of inorganic phosphorus containing acids.

4,024,052

HYDROCARBON CONVERSION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 20, 1975, Ser. No. 633,890
Int. Cl.² C10G 35/06
U.S. Cl. 208—139 24 Claims

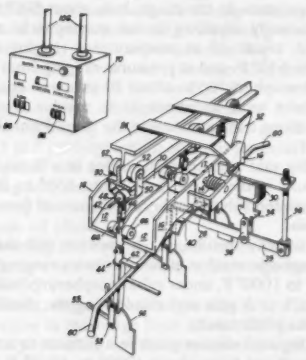
1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with an acidic catalytic composite consisting essentially of a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.05 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % lanthanide series component, and about 0.1 to about 3.5 wt. % halogen, wherein the platinum group metal, catalytically available cobalt, and lanthanide series component are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the lanthanide series component is present in an oxidation state above that of the elemental metal, and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

4,024,053

APPARATUS AND METHOD FOR DETECTING AND DISPENSING ARTICLES OF PRESELECTED WEIGHTS SUSPENDED FROM SHACKLES

Bernard Drew, Jr., Gainesville, and John H. C. Auyang, Lilburn, both of Ga., assignors to Gainesville Machine Company, Inc., Gainesville, Ga.

Filed Sept. 26, 1975, Ser. No. 616,928
Int. Cl.² B07C 5/16
U.S. Cl. 209—73 6 Claims



1. Apparatus for detecting and dispensing articles of preselected weights suspended from shackles movable along at least one path by conveyor means, comprising:

a. scale means for successively weighing the shackles and articles suspended therefrom at at least one weighing station along the path;

b. mechanical to electrical transducer means coupled with said scale means for generating analog electrical signals indicative of sensed weights of shackles and articles suspended therefrom supported on said scale means;

c. means for digitizing the analog electrical signals;

d. digital computer means for comparing the digitized electrical signals generated by said mechanical to electrical transducer means with sets of digital word bits indicative of a preselected set of weight ranges and for generating article release command signals indicative of weight ranges in which the sensed article weights are computed to lie;

e. electrical to mechanical transducer means for releasing articles from the shackles at a plurality of dispensing stations along the path in response to release command signals received from said computer means; and

f. said digital computer means includes means for storing another set of digital word bits indicative of sensed tare weights of a sequence of unloaded shackles in sequential order and for digitally subtracting said another set of digital word bits sequentially from said stored sets of digital word bits.

4,024,054

METHOD OF SEPARATING IONIZED SUBSTANCES FROM AN AQUEOUS SOLUTION

Ulrich Zimmermann, Julich, Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Continuation-in-part of Ser. No. 472,473, May 22, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,464
Claims priority, application Germany, May 23, 1973, 2326224
Int. Cl.² B01D 13/00
U.S. Cl. 210—18 8 Claims

1. In combination for a method of separating metal ions from a mixture which is dissolved in an aqueous solution such as sea water, lake water, waste water and the like containing at least 0.5 mM ions selected from the group consisting of magnesium ions, calcium ions, and potassium ions, by means of complex formers adapted to react and enter into a combination with the substances to be separated, the improvement therewith including steps of: adding to the aqueous solution bubbles formed by cells of living organisms the content of which has an osmolarity differing within limits from the osmolarity of the aqueous solution, said complex formersfor purposes of being received through said cells being added to a solution the osmolarity of which is lower than the cell content of said cells, continuing said addition of said complex formers to said complex former receiving solution until due to said osmosis through the cell skin acting as diaphragm, in the state of equilibrium between the solution in the interior of the cells and the solution containing the complex formers of the cell content practically corresponds to the solution containing the complex formers, increasing the osmolarity of the solution containing the complex formers by adding osmotically active substances selected from the group consisting of calcium ions, potassium ions and sodium ions to the osmolarity which corresponds to the osmolarity of the cell content of the originally introduced cells, subsequently separating the bubbles formed by the exchange of the cell content of said cells and containing said complex formers from the solution containing said aqueous solution until the substances to be separated from said aqueous solution and to be ionized have due to the permeability of the skin of said bubbles moved into the interior of said bubbles and by said complex formers have been converted into complexes which are difficult to be disassociated or dissolved, and separating said cells from said aqueous solution.

4,024,055

METHOD OF REDUCING LEAD AND ACID WASTE CONTAMINATION IN BATTERY PLANT OPERATION

William Arthur Blann, New Berlin, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.

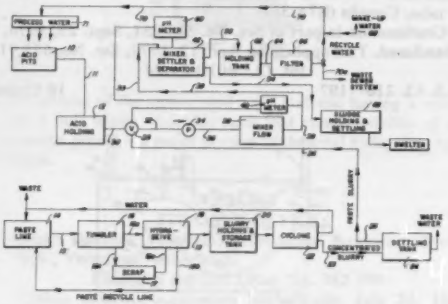
Continuation of Ser. No. 493,584, Aug. 1, 1974, abandoned. This application Dec. 18, 1975, Ser. No. 642,109
Int. Cl.² C02B 1/20, 5/02
U.S. Cl. 210—45 9 Claims

1. A process for treatment of aqueous sulfuric acid waste water in a lead-acid battery manufacturing plant to neutralize the sulfuric acid an reduce the sulfate ion content thereof to produce a waste sewage water effluent with a pH between

about 5.5 and 8.5 and which has a sulfate ion content less than about 600 ppm., which consists essentially of:

a. forming a reaction mixture slurry by combining a waste water stream of sulfuric acid waste with a stream of an aqueous slurry of waste battery paste containing lead oxide through a turbulent in-flow reactor and mixing zone providing turbulent flow mixing conditions, said waste battery paste being essentially the sole neutralizing agent for the sulfuric acid present, to form a slurry reaction mixture;

b. concomitantly adjusting the proportion of waste battery paste added to said slurry to neutralize the sulfuric acid component and concomitantly adjust the pH of the reaction slurry to between about 5.5 and 8.5, forming essentially an insoluble solid sulfate precipitate predominately



of lead sulfate which displays minimal solubility within said pH range;

c. passing the effluent from said reactor zone to a further zoned reactor and separator which comprises a primary and secondary agitated reaction zone;

d. passing the effluent slurry from the primary and secondary agitated reaction zone to a settling and precipitation zone wherein lead sulfate and other solids are separated from the aqueous portion of the slurry by gravity;

e. recovering the neutralized aqueous liquid component of the slurry as an effluent having a pH of from 5.5 to 8.5 from the solid lead sulfate precipitate and other solid materials; and

f. recovering the lead sulfate solids for conversion to lead and lead oxide and recycle and reuse as battery paste in the manufacture of batteries.

4,024,056

FILTERING OF MOLTEN METAL

John C. Yarwood, Madison, Conn.; James E. Dore, Ballwin, Mo., and Robert K. Preuss, Middletown, Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

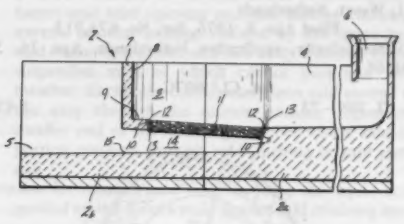
Filed July 21, 1975, Ser. No. 597,963
Int. Cl.² B01D *23/02*
U.S. Cl. 210—69 **23 Claims**

1. In the filtration of molten metal with a removable filter plate, the method which comprises:

providing a filter chamber having a metal inlet and a metal outlet and having a bevelled wall surface adapted to be partitioned by a filter plate;

providing a filter plate for filtration of molten metal having an open cell structure characterized by a plurality of interconnected voids, said plate having a bevelled peripheral surface adapted to mate with the bevelled wall surface of the filter chamber and including a resilient sealing means on said bevelled filter plate surface resistant to said molten metal, wherein said filter plate is a ceramic foam filter plate having an open cell structure characterized by a plurality of interconnected voids surrounded by a web of said ceramic;

inserting said filter plate and sealing means in said filter chamber to engage the bevelled wall surface of the filter chamber; and



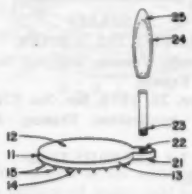
thereafter passing molten metal through said filter plate for discharge through said outlet, wherein the surface of the filter plate is maintained below the level of the molten metal.

4,024,057

PORTABLE, COLD GREASE REMOVER

Dorothy Joan McCoy, 3101 Breneman, Boise, Idaho 83702

Filed June 4, 1976, Ser. No. 693,056
Int. Cl.² B01D *35/18;* **C02B** *1/02*
U.S. Cl. 210—71 **3 Claims**



1. A portable grease removing device for removing grease from the surface of a liquid body, comprising:

A container for containing a coolant, said container having a base in the form of a disc-shaped plate having a planar undersurface with a multiplicity of grease contacting projections protruding therefrom, and a generally cylindrical side wall fixed to said base; said side wall being axially extendable and contractable in an accordian manner.

3. A process for removing grease from the surface of a liquid body comprising:

a. Cooling a disc-shaped grease containing surface which comprises a multiplicity of grease contacting projections protruding therefrom, with a coolant contained within a container formed by said contacting surface and a generally cylindrical side wall to said contacting surface; said side wall being axially expandable and contractable in an accordian manner,

b. Contacting said contacting surface with the surface of said liquid body for a time sufficient to freeze grease thereon,

c. Removing said contacting surface from contact with said surface of said liquid body.

4,024,058

SORTING AND DIRECTING PLANT FOR LOLLIPOPS

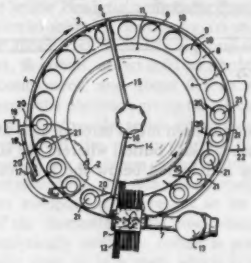
Henricus Antonius Jacobus Maria Derckx, St. Antoniusstraat 31, Weert, Netherlands

Filed Apr. 8, 1976, Ser. No. 674,713

Claims priority, application Netherlands, Apr. 16, 1975, 7504506

Int. Cl.² B07C 5/34

U.S. Cl. 209—73 8 Claims



1. A sorting and directing plant for lollipops supplied via a hopper comprising a first rotating disc, provided at its periphery with a plurality of holes each having a slot extending radially outwards, a stationary disc below the first disc and a second rotating disc incorporated in a circular recess of the stationary disc and positioned in its plane, the direction of rotation of said second rotating disc being contrary to that of the first rotating disc over it and the center of said second rotating disc lying substantially on the pitch circle of the centers of the holes in the first rotating disc, and a third obtuse conical rotating disc being positioned over the first rotating disc the direction of rotation of which is contrary to that of the first rotating disc.

4,024,059

ARTIFICIAL KIDNEY

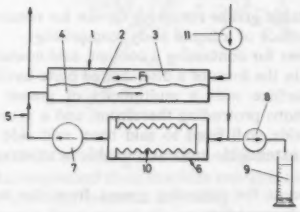
Andre Sausse, Sceaux, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed Apr. 22, 1975, Ser. No. 570,356

Claims priority, application France, Apr. 23, 1974, 74.14007

Int. Cl.² B01D 31/00

U.S. Cl. 210—195 R 11 Claims



1. An artificial kidney comprising, in combination:-

a. a dialysis apparatus;

b. at least one dialysis membrane separating said apparatus into a first compartment and a second compartment;

c. a blood inlet and a blood outlet for the first compartment;

d. a dialysis liquid inlet and a dialysis liquid/outlet from the second compartment;

e. a constant volume closed circuit system including said second compartment, a reservoir and a circulating pump connected to said dialysis liquid inlet and said dialysis liquid outlet, for circulating dialysis liquid therethrough, and means for preventing toxic waste materials being returned to said dialysis liquid inlet;

f. a blood pump for pumping blood through said first chamber; and

g. means for simultaneously maintaining a first zone of said dialysis apparatus, whereby the pressure of blood in said first compartment is higher that the pressure of dialysis liquid in said second compartment and a second zone in which the pressure of blood in said first compartment is lower than the pressure of dialysis liquid in said second compartment.

4,024,060

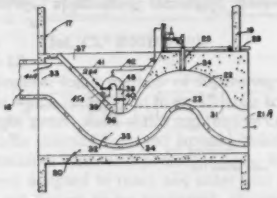
SEWAGE CLARIFIER SYSTEM

Charles Durant Hughes, 1045 4th St. North, Brandon, Manitoba, Canada (R7A 3J2)

Continuation-in-part of Ser. No. 508,251, Sept. 23, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 675,917

Int. Cl.² B01D 21/24

U.S. Cl. 210—197 10 Claims



1. A tube clarifier for the treatment of sewage effluent and the like in conjunction with a main pond and a source of compressed air; comprising in combination at least one settling conduit communicating at one end thereof to said pond and including a discharge end at the other end thereof, an air lock structure connected by one end thereof to said discharge end of said conduit, said airlock structure including a U-tube chamber connected by one end thereof to said discharge end of said conduit and an inverted U tube chamber connected by one end thereof in series with said U tube chamber, said inverted U tube chamber constituting a main airlock assembly, valve means connecting said source of compressed air with the hump of said inverted U-tube chamber to establish and release an airlock in said chamber, means operatively connected to the other end of said inverted U-tube chamber for establishing back pressure at said other end of said inverted U-tube chamber, when said airlock is established in said inverted U-tube chamber, and releasing said back pressure when said airlock is released in said inverted U-tube chamber, a discharge tube connected to and communicating with said U-tube chamber at the upper side of the base of said U-tube chamber, a second airlock assembly in said discharge tube and valve means connecting said source of compressed air with said second airlock assembly for establishing and releasing an airlock in said second airlock assembly.

4,024,061

PULSE DAMPERS FOR LIQUID CHROMATOGRAPHY

John William Gatiss, Cambridge, England, assignor to Pye Limited, Cambridge, England

Filed Aug. 26, 1975, Ser. No. 607,783

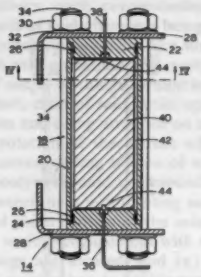
Claims priority, application United Kingdom, Sept. 13, 1974, 40067/74

Int. Cl.² B01D 15/08

U.S. Cl. 210—198 C 8 Claims

1. A liquid chromatograph apparatus comprising a liquid system including a pulse damper, said system being arranged to contain a liquid and having an given total hydraulic capacitance, wherein said pulse damper comprises a chamber having rigid walls and enclosing a cavity having a given volume,

means for communication of said liquid with said cavity, and at least one block formed entirely of a solid material and arranged to be immersed in said liquid, said at least one block being arranged in said cavity and occupying a large portion of



the volume of the cavity, said solid material having a volume and a bulk elastic modulus such that compressibility of said material provides a major portion of the total hydraulic capacitance.

4,024,062

STRAINER DEVICE

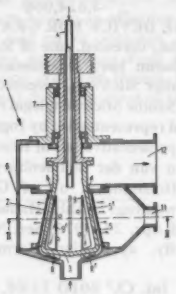
Herman Holthuis, Veendam, Netherlands, assignor to Nivoba B.V., Veendam, Netherlands

Filed July 24, 1973, Ser. No. 382,199

Claims priority, application Netherlands, July 24, 1972, 7210202

Int. Cl.² B01D *29/42*

U.S. Cl. 210—219 **15 Claims**



1. A device for straining substances suspended in liquid, comprising in combination:

a housing having a partition defining first and second liquid discharge chambers, said housing having a wall spaced from said partition and said wall having an inlet opening for liquid plug suspended material leading directly to said first chamber;

a hollow, tapered, stationary straining member bridging between said wall and said partition, the taper of said member providing a larger end and a smaller end therefor and said member having its larger end surrounding said inlet opening and said member extending to said partition whereby to constrain liquid plus some of the suspended material entering through said inlet to pass through said straining member before reaching said first chamber, said partition having an opening aligned with said inlet opening in said wall and surrounded by the smaller end of said straining member whereby to communicate said inlet opening directly with said second chamber;

a body rotatably mounted with respect to said housing about an axis concentric with said straining member, said body having a portion within said straining member which is tapered similarly to said straining member and having a further portion projecting through said opening in said partition thereby to restrict direct communication between said inlet opening and said second chamber to a narrow annular passage defined by the space between said straining member and said body whereby liquid plus suspended material which cannot pass said straining member discharges continuously into said second chamber only through the narrow annular region at said smaller end of the straining member where said further portion projects through said opening in said partition; and

means for rotating said body to force the liquid and suspended material outwardly against said straining member.

4,024,063

FLOATING-MATTER REMOVING APPARATUS

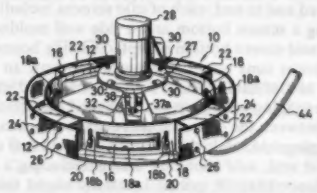
Youzi Mori, Tokyo, Japan, assignor to Kabushiki Kaisha World Chemical, Tokyo, Japan

Continuation of Ser. No. 442,135, Feb. 13, 1974, abandoned. This application July 9, 1975, Ser. No. 594,515

Claims priority, application Japan, Feb. 15, 1973, 48-19021; May 31, 1973, 48-64080; May 31, 1973, 48-64081; Aug. 3, 1973, 48-87315; Aug. 23, 1973, 48-98836

Int. Cl.² E02B *15/04*

U.S. Cl. 210—242 R **10 Claims**



1. In a floating apparatus for removing polluting floating matter from the surface of water, said apparatus having:

a. a vessel main floating body (12) with a sidewall, said sidewall having an inlet opening (54*a*) for the floating matter, said body (12) having therein a radial passage (12*a*) sloping inwardly downwards defining a travel path for the floating matter, said passage (12*a*) having one end terminating in said inlet opening in the sidewall and the other end being within said body (12);

b. storage container means (40) provided on said body (12) in fluid communication with said other end for collecting floating matter entering through said inlet opening (54*a*), with outlet means (42) for discharging lighter liquid to a proper place; the improvement therein wherein said apparatus has an independent slidable external floatable gate arrangement, comprising in combination:

c. a vertical gate plate (56), said plate having opposite ends, said plate being slidably disposed over said inlet opening (54*a*);

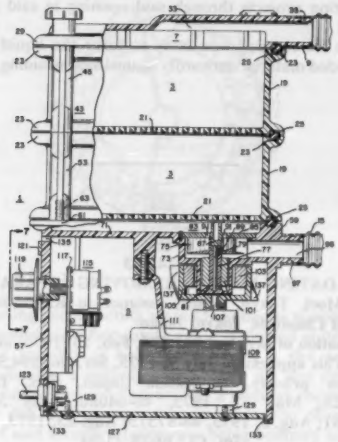
d. a pair of float blocks (22) coupled to said plate opposite ends, for supporting the gate plate on the surface of the water; and,

e. a gate plate inlet port (56*a*) in said gate plate (56) so disposed as to be adapted to be at least partially aligned with said inlet opening (54*a*) so that when said port (56*a*) and said inlet opening (54*a*) are so aligned, floating matter will pass therethrough.

4,024,064
LIQUID TREATING SYSTEM AND INCLUDED FILTER ASSEMBLY

Maurice R. Rakowicz, Castro Valley, and John J. Rodrigues, Orinda, both of Calif., assignors to Kordon Corporation, Hayward, Calif.

Filed Mar. 23, 1973, Ser. No. 344,136
Int. Cl.² B01D *35/26*
U.S. Cl. 210—258 **6 Claims**



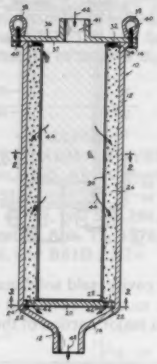
1. A filter assembly comprising a plurality of screens stacked end to end, each of said screens including a receptacle having a screen bottom and a side wall molded together as a unit, said screen bottom receptacle being bounded at its upper and lower rims by a seal engaging means, an end closure at each end of said stacked screens, each end closure having a seal engaging means opposing that of the proximate screen, a seal between the opposing seal engaging means, and means for clamping said stacked screens to seal said seal engaging means to said seal, said clamping means including a plurality of tie rod assemblies at spaced locations about said screens with each tie rod assembly comprising a plurality of disengageable interlocking tie rod assembly components, whereby said tie rod assemblies may be adjusted to accommodate filter assemblies of varying numbers of screen receptacles.

4,024,065
FILTER FOR LIQUID MATERIAL

Howard William Morgan, Jr., Michigan City, Ind., assignor to Filter Specialists, Inc., Michigan City, Ind.

Filed Dec. 4, 1975, Ser. No. 637,737
Int. Cl.² B01D *29/04*
U.S. Cl. 210—315 **6 Claims**

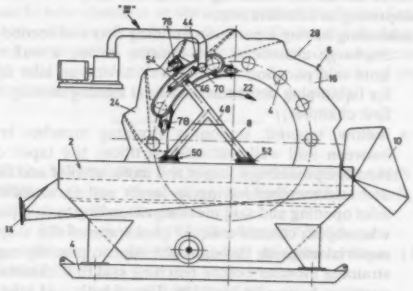
1. A liquid filter comprising in combination a housing and cap, said housing having an open end and including a continuous side wall and an end wall located oppositely from said open end, said cap connected to said housing open end, said combination housing and cap including an inlet port means for receiving a liquid and an outlet port means for discharging said liquid, a wall member fitting transversely within said housing and located between said inlet and outlet port means, said housing side wall having an inner face, said wall member having openings therein peripherally located about said wall member adjacent said side wall inner face, said wall member sealing said inlet port means from said outlet port means except at its said peripheral openings, a liner including first and second end edges and inner and outer side faces defining an interior opening, said liner fitted into said housing between said inlet port means and said wall member, said liner formed of a liquid pervious filtering material, said liner outer face contacting said side wall inner face with said first end edge of the liner positioned against said wall member and overlying said peripheral openings thereof, said inlet port means in communication with the interior opening of said liner whereby liquid will pass from said inlet port means into said liner interior opening and through said liner inner face and thereafter lengthwise of the liner toward said liner first end edge and through said wall member at the peripheral openings thereof and out said outlet port means.



4,024,066
DRAINAGE DEVICE FOR GRAVEL AND SAND

Lothar von Boehn, deceased, late of Rautheim, Germany; by Renate von Boehn born Deichmeier, legal representative, Rautheim; Walter Stichweh, deceased, late of Braunschweig, Germany; by Sabine Stichweh, legal representative; by Petra Stichweh, legal representative; by Inge Stichweh born Sonnabend, legal representative, all of Braunschweig, and by Inge Stichweh born von der Schulenburg, legal representative, Halle uber Holzminden, all of Germany, assignors to Stichweh Verwaltungs-GmbH, Hameln, Germany

Filed Apr. 23, 1975, Ser. No. 570,839
Claims priority, application Germany, Apr. 25, 1974, 2420493
Int. Cl.² B01D *33/08, 33/32*
U.S. Cl. 210—330 **16 Claims**



1. A drainage device for gravel and sand including (a) a bucket wheel dipping into a scooping trough and provided with (i) drive means for rotating the bucket wheel about an axis, said wheel having two side walls and one inner wall spaced radially from the axis of rotation, (ii) a plurality of

scoop buckets distributed around the periphery of the bucket wheel, each of said scoop buckets being inclined whereby the open end of each of said scoop buckets faces the direction of rotation of the bucket wheel, each of said scoop buckets having a mesh-like surface opposite said open end, (iii) a plurality of chambers, each corresponding to one of said scoop buckets, each of said chambers being arranged radially inwardly of the corresponding mesh-like surface and communicating only with said corresponding mesh-like surface, and (iv) a plurality of outlet openings located in one of said walls of the bucket wheel, each of said outlet openings having the same distance from and being arranged on a circle concentric with the axis of rotation of the bucket wheel, each of said outlet openings corresponding to one of said chambers and communications only with said corresponding chamber, the device further comprising a non-rotating suction box located above a horizontal plane containing the axis of rotation of the bucket wheel for sealing engagement with said wall in which said outlet openings are located, and (c) a vacuum pump connected to said suction box to enable suction to be applied sequentially to said chambers during rotation of said bucket wheel, said outlet openings defining a path of travel during rotation of said bucket wheel, said path of travel comprising a first arcuate portion prior to said sealing engagement and permitting partial drainage of said chambers through said outlet openings under the influence of gravity, and a second arcuate portion for effecting sequential alignment of said outlet openings with said suction box to complete said drainage during said sealing engagement, said suction box having leading and trailing segments and a suction chamber therebetween, and being provided with at least one gasket to seal said outlet openings and said segments to prevent communication between said suction chamber and the atmosphere when each of said outlet openings is aligned with said leading and trailing segments of said suction box, each of said segments defining with said at least one gasket respective entrance and exit ports, each of said ports having an effective diameter greater than the diameter of said outlet openings, and each of said outlet openings passing sequentially from said first arcuate portion to said entrance port and thence past said suction chamber to said exit port during rotation of said bucket wheel.

4,024,067

PROCESSES FOR THE PREPARATION OF BIS-BENZOINS AND BIS-BENZILS

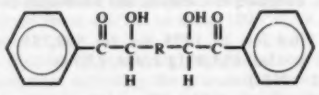
Kazimiera J. L. Paciorek, Corona del Mar; Reinhold H. Kratzer, Costa Mesa, and Dennis W. Karle, Mission Viejo, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 7, 1976, Ser. No. 647,038

Int. Cl.² C07C *49/82*

U.S. Cl. 260—590 D **2 Claims**

1. A bis-benzoin having the formula



wherein R is selected from the group consisting of meta-phenylene and para-phenylene.

4,024,068

PROCESS FOR SEPARATING CERAMICS OF URANIUM AND PLUTONIUM FROM ZIRCONIUM BY HYDRIDING AND MIXTURES THEREOF

Bohuslav Cech; Evzen Kaderabek, and Tomas Hanslik, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Mar. 24, 1975, Ser. No. 561,191

Claims priority, application Czechoslovakia, Mar. 24, 1974, 2134/74

Int. Cl.² C01G *43/00, 56/00*

U.S. Cl. 252—301.1 R **4 Claims**

1. A method of separation of a ceramic component which is a compound of uranium, plutonium or uranium and plutonium from a metallic component is zirconium or an alloy consisting essentially of zirconium and containing minor amounts of tin, iron, chromium, or niobium or combinations thereof comprising the steps of contacting composites, assemblies or mixtures containing said components with hydrogen at a temperature of from about 200° C to 700° C at about 1–100 atmospheric pressure to form brittle zirconium hydride and separating said zirconium hydride from the chemically unchanged ceramic component.

4,024,069

YTTRIUM TANTALATE PHOSPHORS

Simon Larach, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 16, 1975, Ser. No. 596,283

Int. Cl.² C09K *11/08*

U.S. Cl. 252—301.4 R **1 Claim**

1. A phosphor consisting essentially of a host material having a face-centered cubic crystal structure and represented by the empirical formula $[Y_{1-x}Ce_x]_3TaO_7$, wherein x=0.0001 to 0.100 mol.

4,024,070

METHOD OF MANUFACTURING A CERIUM ACTIVATED LUMINESCENT RARE-EARTH ALUMINATE

Roelof Egbert Schuil, Emmasingel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 16, 1975, Ser. No. 578,165

Claims priority, application Netherlands, May 24, 1974, 7406960

Int. Cl.² C09K *11/46*

U.S. Cl. 252—301.4 R **6 Claims**

1. In the method of manufacturing a luminescent rare earth aluminate selected from the group consisting of the cerium activated rare earth aluminates of the formula $Ln_3Al_5O_{12}$ and $LnAlO_3$ wherein Ln is at least one element selected from those having atomic numbers 57 to 71 inclusive and yttrium by heating a starting mixture of the oxides required to produce said aluminate or of compounds capable of producing such oxides upon being heated, together with a flux at a temperature of from about 1200° to 1400° C for about 0.5 to 4 hours the improvement wherein the flux is at least one compound selected from the group consisting of rubidium fluoride, cesium fluoride and potassium fluoride employed in a quantity of from 0.1 to 15% by weight based on the starting mixture.

4,024,071

4,4'-BIS-(s-TRIAZIN-6-yl-AMINO)-STILBENE-2,2'-DISULPHONIC ACID

Werner Fringeli, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

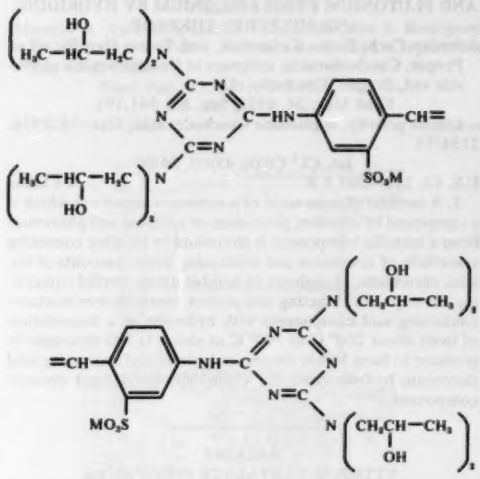
Filed Jan. 7, 1976, Ser. No. 647,243

Claims priority, application Switzerland, Jan. 22, 1975, 770/70

Int. Cl.² C07D *403/00*

U.S. Cl. 252—301.23 **3 Claims**

1. The compound of the formula



wherein M is a cation selected from the group consisting of hydrogen, alkali metal and unsubstituted or substituted ammonium.

4,024,072

WATER-DISPERSIBLE DEFOAMER COMPOSITION

Hugh J. S. Shane, Guelph; Frederick S. Schell, Kitchener, and Mohammad A. Kasem, Ottawa, all of Canada, assignors to Hart Chemical Limited, Guelph, Canada

Filed Feb. 18, 1976, Ser. No. 658,867

Claims priority, application United Kingdom, Feb. 18, 1975, 6808/75

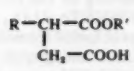
Int. Cl.² B01D *19/04*

U.S. Cl. 252—358 **19 Claims**

1. An intimately admixed defoamer composition, comprising:

a. a mixture of active defoamer components consisting of:

ii. from about 25 to about 60% by weight of a monoester of the formula:



wherein R is at least one long chain alkenyl group havng a total of at least 12 carbon atoms and the formula:

$$R'' - CH = CH - CH_2 -$$

where R'' is a linear or primary branched chain alkyl group, and R' is at least one alkyl group containing at least 12 carbon atoms,

ii. from about 15 to about 65% by weight of an organophosphorus compound selected from the group consisting of n-tributylphosphate, n-tributoxyethylphosphate and triphenyl phosphite,

iii. from about 2 to about 20% by weight of a silicon oil,

iv. from 0 up to about 45% by weight of the other active defoamer components of a 25% by weight solution of a copolymer of vinyl acetate and fumaric acid which has been esterified with tallow alcohol in a hydrocarbon mineral oil, and

b. at least one surfactant effective to impart water dispersibility to said defoamer composition.

4,024,073

HYDROGEL AND PRODUCTION THEREOF

Hirohiko Shimizu, and Hitoshi Ozawa, both of Kamakura, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Continuation of Ser. No. 314,811, Dec. 13, 1972, abandoned. This application Feb. 21, 1975, Ser. No. 551,669

Claims priority, application Japan, Jan. 8, 1972, 47-4795

Int. Cl.² B01J *13/00;* **C08L** *3/02*

U.S. Cl. 252—316 **7 Claims**

1. A hydrogel comprising a water-soluble polymer selected from the group consisting of dextrans, starches and celluloses containing a chelating agent selected from the group consisting of cystine and lysine bound to the polymer chain and a polyvalent metal ion, in which the polymers are cross-linked through chelation between the chelating agents by said polyvalent metal ion.

4,024,074

CATALYST FOR THE OXIDATION OF METHANOL TO FORMALDEHYDE AND PROCESS FOR PREPARING THE SAME

Luciano Cairati, Cassano D'Adda Milan; Ferruccio Trifiro', and Pierluigi Villa, both of Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Mar. 5, 1976, Ser. No. 664,199

Claims priority, application Italy, Mar. 5, 1975, 20918/75

Int. Cl.² B01J *23/88*

U.S. Cl. 252—470 **13 Claims**

1. A method for the preparation of a catalyst active and selective in the oxidation of methanol to formaldehyde and usable in the fluidized form in said oxidation, which comprises:

a. mixing an aqueous solution of a soluble molybdate having a pH value of from 1.05 to 2.8 with an aqueous solution of a soluble ferric salt at a temperature of from 20° to 80° C in such proportions as to ensure in the resulting mixture an atomic ratio of molybdenum to iron of from 1.6:1 to 2.2:1, thereby to obtain a suspension of an amorphous precipitate;

b. heating said suspension for at least 30 minutes at a temperature of from 70° C to its boiling point, thereby to transform said amorphous precipitate into crystalline iron molybdate and molybdenum trioxide;

c. washing the resulting precipitate with water at a temperature from 20°–25° C to 100° C to remove the soluble salts produced;

d. drying the washed precipitate at a temperature not exceeding 120° C, thereby to reduce its water content to a value of from 2 to 8% by weight;

e. reducing the dried precipitate to granules and drying said granules at a temperature not exceeding 300° C to completeiy remove water;

f. impregnating said granules with an aqueous solution of decomposable bismuth salt in such conditions as to ensure an amount of deposited bismuth expressed as metal of from 0.5 to 10% by weight with respect to the crystalline iron molybdate;

g. drying said impregnated granules and calcining them at a temperature of at least 300° C for a period of at least 4 hours.

4,024,075

CARBON AND EROSION-RESISTANT CATALYST

Karl J. Russ, Louisville, Ky., and Donald R. Broughton, Lanesville, Ind., assignors to Catalysts and Chemicals Inc., Louisville, Ky.

Filed July 25, 1975, Ser. No. 598,755

Int. Cl.² B01J *21/04, 23/74*

U.S. Cl. 252—466 J **2 Claims**

1. A catalyst for use in simultaneously reacting hydrocarbons with steam and carbon dioxide to produce hydrogen and carbon monoxide and reducing carbon dioxide to carbon

monoxide at temperatures in the carbon-forming range and with steam to gas ratios of less than 1:1 which consists essentially of a cobalt oxide and an alumina support, in which

A. said cobalt oxide, expressed as the metal, is present in a concentration of from 3 to 25 percent and

B. said alumina support is aluminum oxide in the alpha phase having a surface area of from between 0.5 square meters per gram and 14 square meters per gram, and in which said alumina support has a pore volume expressed as pores having diameters greater than 29 A in the range of from 0.10 to 0.30 cc/gm.

4,024,076
PROCESS FOR PRODUCING GRANULAR SULFURIZED MATERIAL, GRANULAR CARBON OR GRANULAR ACTIVATED CARBON

Hiroshi Miyake, Tokyo; Makoto Iriuchijima; Eiji Takahashi, both of Soka; Kiyoshi Terata, Saitama; Hiroki Kamiyama, Soka; Masami Kurihara, Kohsigaya; Etsuo Suzuki, Saitama, and Tsutomu Idai, Soka, all of Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Filed Dec. 5, 1974, Ser. No. 530,270

Claims priority, application Japan, Dec. 5, 1973, 48-137086; Dec. 11, 1973, 48-137419

Int. Cl.² C01B *31/10, 31/02;* **C10C** *31/02;* **C07G** *17/00*

U.S. Cl. 252—422 **14 Claims**

1. A process for producing an infusible and insoluble granular sulfurized material which comprises reacting for a time necessary to produce a firm dense granular material, a petroleum heavy material and sulfur with agitation in the presence of a reaction medium at a temperature ranging from about 170° C, to about 400° C, said sulfur being present in an amount of about 0.2 to 5 parts by weight per part by weight of said petroleum heavy material, said petroleum heavy material being a liquid or solid at normal temperature and having a softening point of lower than about 400° C, a boiling point higher than about 300° C, an H/C atomic ratio of about 0.2 to 1.9 and a carbon content of about 80 to 96% by weight, and said reaction medium being a hydrocarbon which is a liquid at normal temperature, which has a boiling point of from about 50° C to about 400° C, and which has a low reactivity with sulfur as compared with said petroleum heavy material and which is present in an amount such that the viscosity of the reaction system is less than about 2,000 CS; filtering the reaction mixture to separate an oily material and recover a solid granular sulfurized material.

8. The process as claimed in claim 1, wherein said reacting is in the presence of a Lewis acid metal halide as a catalyst in an amount of about 0.01 to 0.5 part by weight per part by weight sulfur.

9. The process as claimed in claim 1, wherein said reacting is in the presence of a solid carbonaceous material which is insoluble in said reaction system of said petroleum heavy material, said sulfur, and said reaction medium and infusible under said reaction conditions, said solid carbonaceous material being present in an amount of not more than about 2 parts by weight per part by weight of the total amount of said petroleum heavy material and said reaction medium.

10. A process of producing granular carbon which comprises carbonizing the infusible and insoluble granular sulfurized material obtained by the process as claimed in claim 1 by heating said granular sulfurized material to a temperature ranging from about 400° C. to about 1200° C. In an inert gas atmosphere.

11. A process of producing a granular activated carbon which comprises activating the granular carbon obtained by the process as claimed in claim 10 by heating said granular carbon to a temperature ranging from about 700° C. to about 1300° C. under a mild oxidizing atmosphere.

4,024,077
CATALYSTS FOR THE ISOMERIZATION OF HYDROCARBONS, AND PROCESS FOR THE PREPARATION OF SAID CATALYSTS

Philippe Engelhard, and Michel Legendre, both of Le Havre, France, assignors to Compagnie Francaise de Raffinage, France

Filed July 31, 1975, Ser. No. 600,604

Claims priority, application France, Aug. 7, 1974, 74.27478

Int. Cl.² B01J *23/10, 23/40, 27/08, 27/10*

U.S. Cl. 252—442 **25 Claims**

1. A catalyst for the isomerization of hydrocarbons comprising:

a platinum-group metal;

an element selected from the group consisting of yttrium, lanthanum, cerium, praseodymium, neodymium, dysprosium, samarium and gadolinium;

a metal halide selected from at least one of the group consisting of aluminum trichloride, aluminum tribromide, ferric chloride, ferric bromide, and beryllium dichloride; and a carrier for the foregoing which is formed in whole or in part of at least one refractory mineral oxide, and additionally a halogen in combined form.

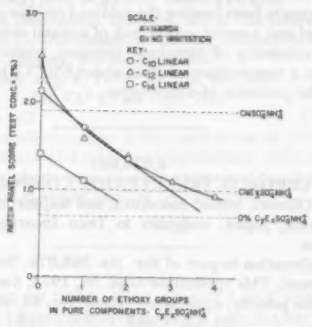
4,024,078
LIQUID DETERGENT COMPOSITION

Lawrence A. Gilbert, Fairfield, and John W. Schuette, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 31, 1975, Ser. No. 563,533

Int. Cl.² C11D *1/14, 1/74, 3/06*

U.S. Cl. 252—551 **24 Claims**



1. A liquid detergent composition comprising:

a. from about 4% to about 80% by weight of a mixture of decyl alcohol alkoxy sulfates wherein the alkoxy radical is selected from the group consisting of ethoxy and isopropoxy radicals and mixtures thereof having a mean alkoxy content of from about one to about four wherein at least about 20% by weight of the decyl alcohol alkoxy sulfates are monoalkoxylated and,

b. from about 20% to about 96% by weight water.

4,024,079
METHOD OF PREPARING A CATALYST FOR TREATMENT OF EXHAUST GASES

Toshiki Okuyama, Ohiso; Sakae Kawagoshi; Tadashi Ikemi, both of Yokohama, and Kiyomi Shimonuri, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jan. 29, 1976, Ser. No. 653,604

Claims priority, application Japan, Jan. 30, 1975, 50-11858

Int. Cl.² B01J *21/04;* **B91J** *21/12;* **B01J** *23/40*

U.S. Cl. 252—455 R **11 Claims**

1. A method of preparing a catalyst for treating exhaust

gases produced by combustion of hydrocarbon fuel, comprising:

coating a substantially chemically inert and substantially catalytically inactive refractory carrier with a liquid containing a sulfur-containing compound of at least one catalytically active metal, said sulfur-containing compound being produced by mixing and reacting in a solvent at least one compound of catalytically active metal and at least one compound selected from the group consisting of ammonium thioglycolate, ammonium thiosulfate and sodium thiosulfate so that the gram atom ratio of the catalytically active metal to the sulfur in the compound thereof is in the range from 1:1 to 1:20;

drying said carrier coated with said sulfur-containing compound of at least one catalytically active metal; and

heat-treating the dried coated carrier in a stream of steam at a temperature ranging from 300° C to 600° C to decompose the compound and fix the catalytically active metal on the surface of the carrier.

4,024,080
PRODUCTION OF 2,2-DISUBSTITUTED PROPIOLACTONES

Jerry D. Holmes, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 491,092, July 23, 1974, Pat. No. 3,931,237, which is a continuation-in-part of Ser. No. 394,370, Sept. 7, 1973, abandoned. This application Sept. 2, 1975, Ser. No. 609,881

Int. Cl.[2] B01J *29/00, 29/16*

U.S. Cl. 252—454 **7 Claims**

1. A catalyst consisting of the metal oxide silica gel complex which results from heating the calcined residue of a mixture of silica gel and a water soluble salt of a metal selected from the group consisting of tantalum, titanium, niobium and zirconium to a temperature of from about 650° C. to about 1000° C. in the presence of water vapor.

4,024,081
FERROELECTRIC CERAMIC COMPOSITIONS

Yasuo Ohmori; Mitsuo Sakakura, and Hajime Miyajima, all of Saitama, Japan, assignors to Toko Incorporated, Tokyo, Japan

Continuation-in-part of Ser. No. 305,076, Nov. 9, 1972, abandoned. This application Sept. 26, 1974, Ser. No. 509,600

Claims priority, application Japan, Nov. 10, 1971, 46-89672

Int. Cl.[2] C04B *35/46, 35/48*

U.S. Cl. 252—62.9 **1 Claim**

1. Fired ferroelectric ceramic compositions consisting essentially of quaternary solid solutions of $Pb(Fe_{\frac{1}{2}}.Nb_{\frac{1}{2}})O_3$ - $Pb(Zn_{\frac{1}{3}}.Nb_{\frac{2}{3}})O_3$-$PbZrO_3$-$PbTiO_3$ in the relative proportions by mol % within the volume defined by a multi-faceted polyhedron enclosing the polygon areas of the ternary diagrams of FIGS. **2, 3, 4** and **5** as sections in numerical order, said compositions having an insulation resistance of at least 0.2×10^4 MΩ, an electro-mechanical coupling coefficient of at least 20% and a Poisson's ratio of at least one-third, said volume having the surface defined by a plurality of polygonal plane surface facets having apices corresponding to the numerals assigned thereto in FIGS. **2–5** as follows:

polygonal plane surfaces (32,48,49,43,36,21), (21,32,79,68), (32,48,87,79), (48,90,87), (48,49,90), (49,43,90), (43,36,83,90), (36,21,68,83), (68,79,113,104), (79,87,121,113), (87,90,123,121), (90,83,110,123), (83,68,104,110), (104,113,141,137), (113,121,148,141), (121,123,148), (123,143,148), (123,110,143), (110,104,137,143), and (137,141,148,143), where said numerals correspond to compositional values designated in mol % in accordance with the following table of relative proportions of compositions:

	$Pb(Zn_{\frac{1}{3}}.Nb_{\frac{2}{3}})O_3$	$Pb(Fe_{\frac{1}{2}}.Nb_{\frac{1}{2}})O_3$	$PbZrO_3$	$PbTiO_3$
21	10	10	50	30
32	10	10	30	50
36	10	50	30	10
43	10	60	20	10
48	10	50	10	30
49	10	60	10	20
68	20	10	40	30
79	20	10	20	50
83	20	50	20	10
87	20	30	10	40
90	20	60	10	10
104	30	10	40	20
110	30	30	30	10
113	30	10	20	40
121	30	30	10	30
123	30	50	10	10
137	40	10	30	20
141	40	10	20	30
143	40	30	20	10
148	40	30	10	20

4,024,082
ANALGESICS

Richard Anthony Partyka, Liverpool; Maxwell Gordon, Dewitt, both of N.Y.; Tetsuji Kametani, Sendai, and Kazuo Kigasawa, Tokyo, both of Japan, assignors to Bristol-Myers Company, New York, N.Y., by said Richard Anthony Partyka and Maxwell Gordon

Filed Aug. 19, 1975, Ser. No. 605,950

Int. Cl. C07D *471/08*

U.S. Cl. 260—250 C **10 Claims**

1. A process of resolving (+)-N-cyclopropylmethyl-3-hydroxy-9-azamorphinan into its essentially pure (+) and (−) optical isomers, which process comprises the consecutive steps of

A. dissolving the racemic mixture and d-O,O-dibenzoyltartaric acid or (2R:3R)-2′-nitrotartranilic acid or (2S:3S)-2′-nitrotartranilic acid, in a ratio of about 0.5 to 1.5 moles of acid per mole of azamorphinan, in a polar solvent selected from the group consisting of methanol, ethanol, isopropanol and acetone, to produce the diastereoisomer salt of the (+) or (−)-azamorphinan, which is collected;

B. concentrating the mother liquors from step A and adding additional d-O,O-dibenzoyltartaric acid or (2R:3R)-2′-nitrotartranilic acid or (2S:3S)-2′-nitrotartranilic acid to the solution to produce the diastereoisomer salt of the optical isomer not collected in step A, which is collected; and

C. treating separately the essentially pure diastereoisomer salts isolated in steps A and B with a base to liberate the essentially pure (+) and (−) optical isomers.

8. l-N-Cyclopropylmethyl-3-hydroxy-9-azamorphinan d-O,O-dibenzoyltartrate.

9. d-N-Cyclopropylmethyl-3-hydroxy-9-azamorphinan (2R:3R)-2′-nitrotartranilate.

10. l-N-Cyclopropylmethyl-3-hydroxy-9-azamorphinan (2S:3S)-2′-nitrotartranilate.

4,024,083
SUBSTITUTED PHENOXY PROPANOL DIAMINES AND AMINO ALCOHOL DETERGENT ADDITIVES FOR FUELS AND MINERAL OILS

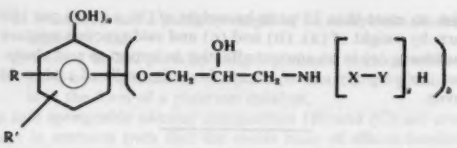
Mahmoud S. Kablaoui, and Joseph B. Biasotti, both of Wappingers Falls, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 8, 1976, Ser. No. 665,031

Int. Cl.[2] C10M *1/22, 1/34;* **C10L** *1/18;* **C07C** *93/06*

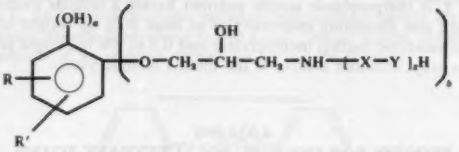
U.S. Cl. 252—51.5 R **11 Claims**

1. A mineral oil composition comprising a mixture of hydrocarbons boiling in the range of about 80° to 1000° F. containing an effective detergent amount of a compound represented by the formula:



in which R is a hydrocarbon radical having a molecular weight ranging from about 200 to 1500, R′ is hydrogen or an alkyl radical having from 1 to 4 carbon atoms, X is a divalent hydrocarbon radical having from 2 to 6 carbon atoms, Y is NH or O, *a* has a value from 0 to 1, *b* has a value from 1 to 2 with the sum of *a* and *b* not extending 2, and *z* has a value from 1 to 10.

8. The compound represented by the formula:



in which R′ is a hydrocarbon radical having from 1 to 4 carbon atoms, R is a hydrocarbon radical having a molecular weight ranging from about 200 to 1500, X is a divalent hydrocarbon radical having from 2 to 6 carbon atoms, Y is NH or O, *a* has a value from 0 to 1, *b* has a value from 1 to 2 with the sum of *a* and *b* not exceeding 2, and *z* has a value from 1 to 10.

4,024,084

DISPERSION FOR APPLYING SOLID PARTICLES ON SURFACES BY AN ELECTROPHOTOGRAPHIC PROCESS

Hans Günter Sittardt; Siegfried Stotz, both of Aachen, Germany; Dirk Jan Zwanenburg, and Wilhelmus Adrianus Petrus Reijnen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,446

Claims priority, application Germany, Dec. 21, 1974, 2460763

Int. Cl.² G03G 9/12

U.S. Cl. 252—62.1 L **9 Claims**

1. A dispersion for applying solid particles on a surface by an electrophotographic process, said dispersion comprising, in addition to the solid particles to be applied to the surface, a non-polar liquid dispersing agent for said solid particles, a non-ionic macromolecular compound of a molecular weight of 100,000 – 1,500,000, soluble in said liquid dispersing agent and as the sole substance for controlling the charge on said solid particles a metal salt selected from the group consisting of salts of the formulae:

$$Al(AN)_n(OH)_{3-n}$$

and

$$Cr(AN)_n(OH)_{3-n}$$

wherein $n = 1, 2$, or 3 and AN is the acid residue of an anthranilic acid, the amino group of which is acylated with a fatty acid of 6 to 20 carbon atoms, said metal salt being soluble in the dispersing agent and being present in an amount of 10^{-3} to 10^{-1}g per 100 g of said solid particles.

4,024,085

GUM REMOVING SOLUTION FOR LITHOGRAPHIC PLATE

Kesanao Kobayashi, and Hiroshi Matsumoto, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Oct. 3, 1974, Ser. No. 511,856

Claims priority, application Japan, Oct. 3, 1973, 48-111303

Int. Cl.² C11D 7/08, 7/16, 7/32, 7/50

U.S. Cl. 252—136 **6 Claims**

1. A process for removing gum arabic or cellulose gum from lithographic plates comprising applying to the surface of a lithographic printing plate a gum removing solution consisting essentially of an aqueous solution of at least one compound selected from the group consisting of

i. compounds selected from the group consisting of lactic acid, citric acid, tartaric acid, Rochelle salt, hydroxyacetic acid, sodium citrate, potassium citrate, ammonium citrate, sodium lactate, ammonium lactate and potassium lactate, and

ii. compounds selected from the group consisting of propiolactone, butyrolactone, valerolactone, propiolactam, valerolactam, hexanolactone, pyrrolidone, methylpyrrolidone and γ-caprolactone, said aqueous solution containing 4.5 to 16.7 weight percent of said compounds selected from said group, the substantial balance of said solution being water, and said solution having a pH of about 1 to 5.5;

and removing said gum removing solution from said surface without damaging the image.

4,024,086

CONSTANT BOILING ADMIXTURES

William Milton Hutchinson, deceased, late of Claremore, Okla. (by Florence M. Hutchinson, executrix), assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 6, 1975, Ser. No. 602,353

Int. Cl.² C11D 7/50, 7/30

U.S. Cl. 252—162 **2 Claims**

1. A substantially constant boiling admixture of (A) 1,1,2-trifluoroethane and (B) octafluorocyclobutane which at substantially atmospheric pressure is characterized by a composition of about 21.6 weight percent (A) and about 78.4 weight percent (B).

4,024,087

METHOD OF PREPARING COAGULANT FOR PURIFICATION OF WATER FROM MECHANICAL ADMIXTURES

Jury Abramovich Lainer, prospekt Vernadskogo, 113 kv. 183, Moscow; Eldar Ismail Ogly Tagiev, 22 Nagornaya ulitsa, 13, blok 2, kv. 27, Baku; Gakif Zakirovich Nasyrov, prospekt Nauki, 12, kv. 49, Leningrad; Valentina Ivanovna Zakharova, Khoroshevskoe shosse, 1, kv. 60, Moscow, all of U.S.S.R.; Abram Ilich Lainer, deceased, late of Moscow, U.S.S.R.; Vera Nikolaevna Lainer, administrator, Volokolamskoe shosse, 6, kv. 131, Moscow, U.S.S.R.; Jury Abramovich Lainer, administrator, prospekt Vernadskogo, 113, kv. 183, Moscow, U.S.S.R., and Nina Abramovna Gelfand, administrator, 9 Parkovaya ulitsa, 47, korpus 2, kv. 46, Moscow, U.S.S.R.

Filed Nov. 6, 1975, Ser. No. 629,703

Int. Cl.² C02B 5/02

U.S. Cl. 252—179 **6 Claims**

1. A method of preparing a coagulant from alunite for purification of water from mechanical admixtures comprising the steps of roasting alunite at a temperature of 520°–620° C.; leaching the roasted alunite at a temperature of 80°–100° C. with a 20–35 percent solution of sulphuric acid in an amount of 70–90 per cent of the stoichiometrically required amount; adding roasted alunite to the leached alunite in an amount of 10–15 percent of the weight of the starting alunite to form a

pulp consisting of solid and liquid phases, the liquid phase being an aqueous solution of the end product and the solid phase being an insoluble residue; separating said solution from said insoluble residue; and isolating the end product from said solution.

4,024,088

COMPOSITIONS AND METHODS USEFUL IN FORMING POLYETHER POLYURETHANES HAVING RELEASE PROPERTIES

Robert E. Godlewski, Mahopac, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 536,956

Int. Cl.² C08G *18/30, 18/14;* **B29C** *1/04*

U.S. Cl. 260—2.5 A **21 Claims**

1. In a composition consisting essentially of an organic polyisocyanate and an organic polyether having at least two active hydrogen atoms reactive with said polyisocyanate, that improvement imparting to said composition the property of self-release from the walls of a mold cavity comprising an organophosphorus compound selected from the class consisting of compounds of the formulas:

$$(RO)_nR'_{3-n}P(O)$$

and

$$(RO)_nR'_{3-n}P$$

wherein R is a monovalent hydrocarbon group of at least 8 carbon atoms, R′ is selected from the class consisting of hydrogen, hydroxyl and monovalent hydrocarbon groups, and *n* is an integer of 1 to 3, mixed in said composition in an amount effective to impart said self-release property.

15. A method for producing a cellular polyurethane-polyurea elastomer which comprises forming in a mold cavity having metal walls and curing a reaction mixture containing:

a. a polymer polyol comprising a major amount of liquid polyoxyalkylene polyol that has a molecular weight of at least 1,500 and a hydroxyl number from 20 to 120 and that contains therein a minor amount of a film-forming organic polymer having a molecular weight of at least 5,000,

b. an aromatic polyamine having at least two primary amine groups attached to carbon atoms of the same or different aromatic rings, at least one of such carbon atoms being adjacent to a carbon atom having a substituent other than hydrogen,

c. an aromatic glycol,

d. an organic polyisocyanate in an amount that provides from 0.8 to 1.3 isocyanato groups per active-hydrogen group in the reaction mixure,

e. a catalytic amount of catalyst for the curing of the reaction mixture to produce the elastomer, and

f. a blowing agent in an amount sufficient to produce a cellular structure in the elastomer,

g. an organophosphorus compound selected from the class consisting of phosphatides and compounds of the forumlas:

$$(RO)_nR'_{3-n}P(0)$$

and

$$(RO)_nR'_{3-n}P$$

wherein R is a monovalent hydrocarbon group of at least 8 carbon atoms, R′ is selected from the class consisting of hydrogen, hydroxyl and monovalent hydrocarbon groups, and *n* is an integer of 1 to 3,

said reaction mixture containing from 97 to 65 parts by weight of (a) and from 3 to 35 parts by weight of (b) per 100 parts by weight of (a) and (b) and said reaction mixture containing from 1 to 35 parts by weight of (c) per 100 parts by weight of (a) and (c), with the proviso that the reaction mixture contains no more than 35 parts by weight of (b) and (c) per 100 parts by weight of (a), (b) and (c) and said reaction mixture containing (g) in an amount effective to impart to said elastomer the property of self-release from the walls of said mold cavity.

4,024,089

FOAMED ACRYLIC POLYMER FOAM CONTAINING ETHYL CELLULOSE

John Lewis Moilliet, Abberley, and James Ernest Ryan, Knebworth, both of England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 368,024, June 8, 1973, Pat. No. 3,897,371. This application Apr. 25, 1975, Ser. No. 571,741

Claims priority, application United Kingdom, June 14, 1972, 27749/72

Int. Cl.² C08J *9/30*

U.S. Cl. 260—2.5 L **6 Claims**

1. A thermoplastic acrylic polymer having a cellular structure and consisting essentially of at least 80% by weight of polymerized methyl methacrylate and 0.5 to 5% by weight of an ethyl cellulose soluble in the methyl methacrylate.

4,024,090

PROCESS FOR MOLDING POLYURETHANE FOAMS

Wulf von Bonin; Helmut Kleimann, both of Leverkusen, and Udo Post, Berg.-Gladbach, Paffrath, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 6, 1974, Ser. No. 521,425

Claims priority, application Germany, Dec. 20, 1973, 2363452

Int. Cl.² C08K *5/54*

U.S. Cl. 260—2.5 AH **15 Claims**

1. In a process for molding foam plastics in a closed mold by foaming a reaction mixture containing an organic polyisocyanate, an organic compound having a molecular weight of about 62 to about 10,000 which has at least two reactive hydrogen atoms, and a blowing agent, the improvement which comprises including in the reaction mixture, as an internal mold release agent, an esterification reaction product of a polysiloxane which contains $—CH_2OH$ groups which are attached directly to a silicon atom, and a monocarboxylic or polycarboxylic acid, with the proviso that the esterification reaction is conducted in such a manner that in the case of polycarboxylic acids, substantially only one carboxylic group of the polycarboxylic acid is reacted for each $—CH_2OH$ group of the polysiloxane.

4,024,091

SPONGEABLE SILICONE GUM STOCK

Chi-Long Lee, and Gary M. Ronk, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 14, 1975, Ser. No. 595,918

Int. Cl.² C08J *9/02*

U.S. Cl. 260—2.5 S **16 Claims**

1. A spongeable silicone composition comprising:

a. 100parts by weight of a polydiorganosiloxane gum base stock wherein the gum has a Williams plasticity of greater than 0.030 inch,

B. from 15 to 60 parts by weight of an organosiloxane having an average of at least 2 silicon-bonded hydroxyl radicals per molecule, where the organosiloxane (B) has from 0.5 to 3 parts by weight silicon-bonded hydroxyl radical in the amount of organosiloxane (B) present,

C. from 3 to 25 parts by weight of an organohydrogensiloxane having an average of at least 2.5 siliconbonded hydrogen atoms per molecule, where the organohydrogenisiloxane (C) has from 0.01 to 0.5 parts by weight silicon-bonded hydrogen atoms in the amount of organohydrogensiloxane (C) present,

D. from 0.05 to 0.5 parts by weight of an acetylenic alcohol inhibitor, and

E. from 1 to 200 parts by weight platinum per one million parts by weight silicon composition wherein the platinum is in the form of a platinum catalyst,

in said spongeable silicone composition (B) and (C) are present in amounts such that the molar ratio of silicon-bonded hydrogen atoms to silicon-bonded hydroxyl radicals is from 1 to 5.

4,024,092
POLYMER COMPOSITIONS CONTAINING STILBENE HALIDE ADDITIVES

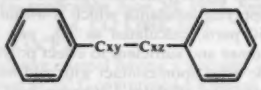
Fred Sonnenberg, Worcester, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.

Continuation-in-part of Ser. No. 639,567, Dec. 10, 1975, abandoned. This application June 4, 1976, Ser. No. 692,832

Int. Cl.² C08K *5/03*

U.S. Cl. 260—2.5 FP **10 Claims**

1. An alkenyl aromatic polymer composition having dispersed therein from about 0.1 to about 10% by weight of the polymer of an additive compound having the formula:



wherein:

x is selected from the group consisting of H and Cl

y is selected from the group consisting of H, Br and Cl,

z is selected from the group consisting of Br and Cl, provided that when y or z is Br, x is H.

4,024,093
FLAME RETARDANT POLYPHENYLENE ETHER RESIN COMPOSITIONS CONTAINING A HALOGENATED FLAME RETARDANT AND SELECTED ORGANIC IRON SALTS

Visvaldis Abolins, Delmar, and Fred F. Holub, Schenectady, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Jan. 23, 1975, Ser. No. 543,280

Int. Cl.² C08L *5/00, 25/09;* **C08K** *5/09*

U.S. Cl. 260—17.4 SG **25 Claims**

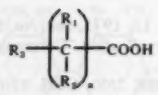
1. A flame retardant thermoplastic molding composition which comprises:

a. a polyphenylene ether resin;

b. a vinyl aromatic resin;

c. a flame retardant amount of an aromatic halogenated flame retardant; and

d. a flame retardant amount of an organic iron compound in which the organic group is derived from a compound of the formula:



wherein R_1 is selected from the group consisting of hydrogen, hydroxyl and lower alkylene carboxy wherein the alkylene moiety has from 1–4 carbon atoms; R_2 is selected from the group consisting of hydrogen, hydroxyl and lower alkyl of 1–4 carbon atoms; R_3 is selected from the group consisting of hydrogen, lower alkyl of 1–4 carbon atoms, hydroxyl, lower alkylene carboxy, aryl, aralkyl, alkaryl, lower alkylidene carboxy wherein the alkylidene moiety has from 1 to 4 carbon atoms and *n* is a whole number of from 1 to 20 with the proviso that no compound has more than six hydroxy groups.

4,024,094
PHENOLIC RESIN COMPOSITION FOR LAMINATES

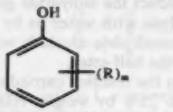
Masaharu Kurata; Mineaki Tanigaichi, and Kazuyuki Ohya, all of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Sept. 19, 1974, Ser. No. 507,337

Int. Cl.² C08L *93/04*

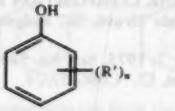
U.S. Cl. 260—19 N **10 Claims**

1. A phenolic resin composition for manufacturing laminates which comprises a modified phenolic resin having incorporated therewith 1–40% by weight of polycarbonate resin wherein said modified phenolic resin is a reaction product obtained by reacting a phenol of the general formula



(I)

wherein R is methyl and *m* is 0, 1 or 2, with a modifier and formaldehyde in the presence of a catalyst, wherein said modifier is selected from the group consisting of a drying oil, an aromatic hydrocarbon-formaldehyde resin, rosin, a petroleum resin and a higher alkyl- or arylphenol of the general formula



(II)

wherein R′ is a long chain alkyl having at least 4 carbon atoms, phenyl or a substituted phenyl and *n* is 1 or 2.

4,024,095
PROCESS FOR THE MANUFACTURE OF HEAT-CURABLE SYNTHETIC RESIN WHICH CAN BE DILUTED WITH WATER AND ARE SUITABLE FOR THE ELECTROPHORETIC COATING PROCESS

Bernhard Broecker, Kelkheim, and Richard Schardt, Oststeinbek, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Continuation-in-part of Ser. No. 470,264, May 15, 1974, abandoned. This application Jan. 29, 1975, Ser. No. 544,890

Claims priority, application Germany, Mar. 9, 1974, 2411419

Int. Cl.² C08K *5/00*

U.S. Cl. 260—23.7 A **17 Claims**

1. Process for the manufacture of heat-curable synthetic resins, based on reaction products of maleic anhydride with mixtures of polybutadiene, unsaturated hydrocarbon resins and unsaturated fatty acid glyceride esters, which can be diluted with water and are suitable for the electrophoretic coating process, wherein a mixture consisting of:

a. 35–60% by weight of a polybutadiene having an average molecular weight of 750–2,000 and an iodine number between 300 and 450,

b. 10 – 30% by weight of a reactive hydrocarbon resin with a predominantly aliphatic or cycloaliphatic structure having a viscosity between 30 and 800 cP (measured at 20° C in a 70% strength solution in toluene), an iodine number between 160 and 220 (according to ASTM D 555) and an average molecular weight of approx. 400 to 700, consisting of

b_1. 5 – 30% by weight of polyisoprene,

b_2. 30 – 80% by weight of cyclopentadiene and/or dicyclopentadiene and/or alkyl or alkylene derivatives of cyclopentadiene,

b_3. 5 – 15% by weight of other singly unsaturated or

polyunsaturated hydrocarbons with 5 to 12 carbon atoms and with a predominantly aliphatic or cycloaliphatic structure,

c. 5–25% by weight of a fatty acid glyceride ester, wherein the fatty acid radical contains 16–18 C atoms and the fatty acid glyceride ester has an iodine number between 140 and 220, is pre-polymerised by heating to 200°–270° C until the reaction mixture of components(a), (b) and (c), which has an initial viscosity of about 100–350 sec (measured according to DIN 53,211), displays viscosities between 500 and 2,000 sec (measured according to DIN 4 53,211), the resulting mixture is then reacted with

d. 15–20% by weight of maleic anhydride at 180°–190° C until no further free maleic anhydride is present and

e. in the resulting adduct the anhydride groups present are opened by hydrolysis with water or by alcoholysis with the amount of monohydric alcohols with 1–4 C atoms required to form the half-ester,

characterised in that in the reaction carried out to modify the process products, 5 to 25% by weight, relative to the total weight of the components (a), (b), (c) and (d), of adducts of α,β-unsaturated aliphatic dicarboxylic acids to resin acids and/or adducts which are partially or completely esterified with polyhydric saturated aliphatic alcohols, are co-used as component (f).

4,024,096

JET PRINTING INK COMPOSITION FOR GLASS

Joseph Wachtel, Buffalo Grove, Ill., assignor to A. B. Dick Company, Niles, Ill.

Filed July 7, 1975, Ser. No. 593,757

Int. Cl.² C08G *51/24*

U.S. Cl. 260—29.3 **11 Claims**

1. An ink composition consisting essentially of

1 – 30% by weight linear novolac resin

0.4 – 5% by weight soluble dyestuff

0 – 20% by weight evaporation retardant

0 – 1.5% by weight alkali metal thiocyanate

Remainder water and $C_1 - C_3$ alcohol, with the water present in an amount up to 80% by weight of the alcohol, said ink having a viscosity (20° C) within the range of 1.0 – 8.0 cps, an electrical resistivity of less than 3000 ohm-cm, surface tension of 22.5 – 60 dynes/cm, sonic viscosity within the range of 1200 – 1800 meters/sec. and a specific gravity within the range of 0.800 – 1.045.

4,024,097

STABLE WATER-IN-OIL EMULSION POLYMERS WITH SMALL PARTICLE SIZE

Manuel Slovinsky, Woodridge, and John R. Hurlock, Hickory Hills, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Nov. 19, 1975, Ser. No. 633,304

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.6 N **6 Claims**

1. In a method for preparing water-in-oil emulsions of water soluble vinyl addition polymers and copolymers of the general type wherein a water-in-oil emulsion is formed consisting of a water-soluble ethylenically unsaturated monomer having a water solubility of at least 5 weight percent and aqueous solutions thereof, in an inert hydrophobic liquid organic dispersion medium containing between 0.1 and 21.0 percent by weight of a water-in-oil emulsifying agent, wherein the proportion of monomer phase ranges between 30 and 95% of the emulsion, heating the emulsion under free radical forming conditions to polymerize the monomer in a disperse phase in said dispersion medium and recovering the polymerized latex product, the improvement which comprises using a water-in-oil emulsifying agent an oil soluble partially esterified lower N,N-dialkanol fatty amide wherein the fatty group contains from 15–22 carbon atoms, said esterifying agent being a fatty acid containing 15–22 carbon atoms and being reacted with the lower N,N-dialkanol fatty amide in a mole ratio of fatty acid to amide of 0.25:1 to 0.75:1.

4,024,098

REINFORCING COMPOSITION FOR MINERAL STRUCTURES

Tadashi Yamaguchi; Takayuki Ono, both of Sendai; Hiroshi Hoshi, Narashino; Michio Hirakawa, and Isao Watanabe, both of Ichikawa, all of Japan, assignors to Mitsui Toatsu Kagaku Kabushiki Kaisha (Mitsui Toatsu Chemicals, Incorporated), Tokyo, Japan

Continuation of Ser. No. 408,263, Oct. 23, 1973, abandoned. This application Aug. 13, 1975, Ser. No. 604,090

Claims priority, application Japan, Oct. 23, 1972, 47-105218; Feb. 3, 1973, 48-13917

Int. Cl.² C08L *33/08, 33/10, 37/00*

U.S. Cl. 260—29.6 MQ **2 Claims**

1. A composition for impregnating and reinforcing mineral masses by in situ polymerization therein which is stable against polymerization until contacted with said mineral mass, said composition being formed of a liquid mixture consisting essentially of at least one radical polymerizable liquid monomer selected from the group consisting of methyl acrylate, methyl methacrylate, and glycidyl methacrylate and an amount of a bisulfite ion-supplying substance which is within the range of about 0.001–50 parts, calculated as SO_2, per 100 parts by weight of monomer and sufficient to effect polymerization of said monomeric ester upon contact with said mineral mass.

2. The composition of claim 1 wherein said bisulfite ion-supplying substance is an aqueous solution of sulfurous acid and said monomer is dispersed in said solution.

4,024,099

HIGH-MOLECULAR WEIGHT ACIDIC POLYMERS

William E. Franklin, and Stanley P. Rowland, both of New Orleans, La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 501,416, Aug. 28, 1974, Pat. No. 3,932,560. This application Oct. 30, 1975, Ser. No. 627,324

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.6 H **4 Claims**

1. A process for preparing highly viscous aqueous solutions of acidic polymers comprising polymerizing acidic monomers selected from the group consisting of acrylic acid and methacrylic acid in an aqueous solution containing a free radical initiating catalyst and a methylol compound selected from the group consisting of formaldehyde, dimethyloldihydroxyethylene urea, dimethylolethyltriazone and dimethylolethyl carbamate.

4,024,100

POLYSILOXANE MODIFIED COATINGS

Peter Kuhn, Krefeld; Karl Raichle, Krefeld-Bockum; Rolf Kuchenmeister, Krefeld, and Bernd Peltzer, Krefeld-Bockum, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

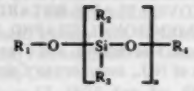
Filed Feb. 12, 1975, Ser. No. 549,365

Claims priority, application Germany, Feb. 16, 1974, 2407566

Int. Cl.² C08K *5/00;* **C08L** *43/04, 83/10*

U.S. Cl. 260—30.4 N **9 Claims**

1. A composition containing 5 to 30 parts by weight of an aminoplast which is based on a benzoguanamine resin and 95 to 70 parts by weight of a polysiloxane modified saturated polyester which is the condensation product of aromatic and aliphatic dicarboxylic acids, at least one polyol having up to three hydroxyl groups and a polysiloxane, from 100 to 40 mol % of said aromatic dicarboxylic acid being o-phthalic acid, from 85 to 100 mol % of said polyol being a diol and from 0 to 15 mol % of said polyol being a triol, said polysiloxane being of the formula:



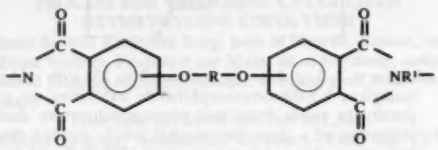
wherein n is from 2 to 5, R_1 and R_4 are alkyl having 1 to 4 carbon atoms, phenyl, tolyl or benzyl, and R_2 and R_3 alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, phenyl, tolyl or benzyl and 100 parts by weight of the polysiloxane modified polyester contain 1 to 11 parts by weight of the polysiloxane and said polysiloxane modified saturated polyester being dissolved in a solvent to produce a solution having a solids content of from 40 to 70%.

4,024,101
METHOD FOR MAKING POLY-ETHERIMIDES AND PRODUCTS PRODUCED THEREBY

Tohru Takekoshi, Scotia, N.Y., and John E. Kochanowski, Pittsfield, Mass., assignors to General Electric Company, Schenectady, N.Y.

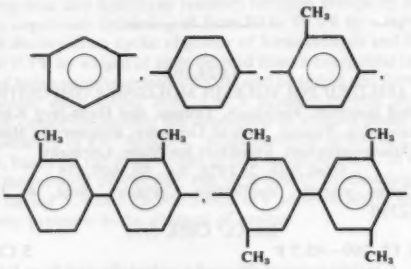
Division of Ser. No. 372,769, June 22, 1973, Pat. No. 3,917,643. This application June 30, 1975, Ser. No. 591,771
Int. Cl.² C08K *5/13*
U.S. Cl. 260—33.4 P **4 Claims**

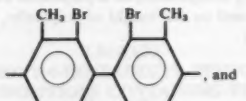
1. A wire coating enamel having a viscosity of from 200 to 2000 centipoises at 25° C comprising a solution of a polyimide in a phenolic solvent where the polyetherimide consists essentially of chemically combined units of the formula,



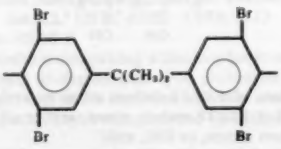
where R is selected from the class consisting of

a. the following divalent organic radicals,



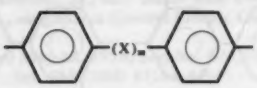


, and

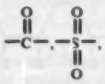


and

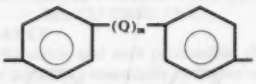
b. divalent organic radicals of the general formula,



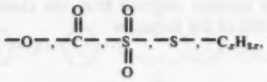
where X is a member selected from the class consisting of divalent radicals of the formulas $-C_yH_{2y}-$,



-O-, and -S-, where m is 0 or 1, y is a whole number from 1 to 5, and R^1 is a divalent organo radical selected from the class consisting of (a) aromatic hydrocarbon radicals having from 6–20 carbon atoms and halogenated derivatives thereof, (b) alkylene radicals, $C_{(2-8)}$ alkylene terminated polydiorganosiloxane cycloalkylene radicals having from 2–20 carbon atoms, and (c) divalent radicals included by the formula,



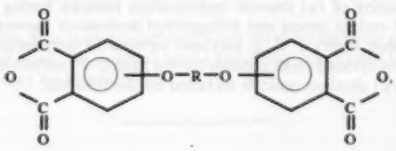
where Q is a member selected from the class consisting of



and x is a whole number from 1 to 5 inclusive, and m is as previously defined.

2. A method for making a wire coating enamel comprising

1. effecting reaction between aromatic bis(ether anhydride) of the formula,

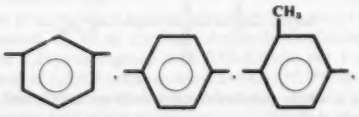


and organic diamine of the formula,

$$H_2HR^1NH_2,$$

in the presence of a phenolic solvent at temperatures between about 100° C to 250° while effecting the removal of water of reaction,

where R is selected from the class consisting of (a) the following divalent organic radicals:



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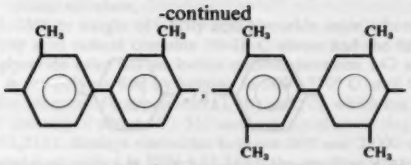
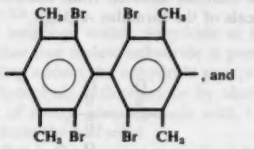
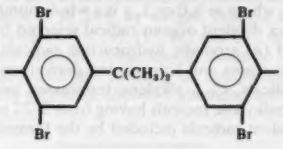
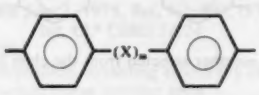


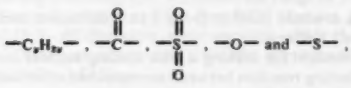




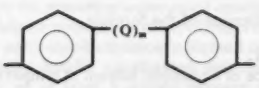
and (b) divalent organic radicals of the general formula



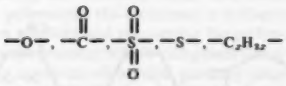
where X is a member selected from the class consisting of divalent radicals of the formulas



and -S-, where m is 0 or 1, y is a whole number from 1 to 5, and R^1 is a divalent organo radical selected from the class consisting of (a) aromtic hydrocarbon radicals having from 6–20 carbon atoms and halogenated derivatives thereof, (b) alkylene radicals, $C_{(2-8)}$ alkylene terminated polydiorganosiloxane cycloalkylene radicals having from 2–20 carbon atoms, and (c) divalent radicals included by the formula,



where Q is a member selected from the class consisting of



and x is a whole number from 1 to 5 inclusive, and m is as previously defined.

4,024,102

MOLDING COMPOSITION SUITABLE FOR FORMING IMPROVED FLAME RETARDANT THREE-DIMENSIONAL SHAPED ARTICLES

Robert W. Stackman, Morristown, and Frank M. Berardinelli, Millington, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Feb. 13, 1974, Ser. No. 442,038

Int. Cl.² C08L *67/02*

U.S. Cl. 260—40 R **11 Claims**

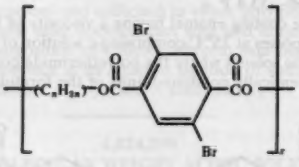
1. A molding composition having flame retardant properties when molded into three-dimensional articles comprising a physical admixture of

a. about 30 to 80 percent by weight of a non-halogenated polyalkylene terephthalate selected from the group consisting of polypropylene terephthalate and polybutylene terephthalate having an inherent viscosity of about 0.2 to about 1.4 deciliters per gram,

b. about 2 to 7 percent by weight of an oxide of antimony,

c. about 2 to 60 percent by weight of a reinforcing agent, and

d. as an organic flame retardant additive about 5 to 20 percent by weight of a polyalkylene-2,5-dibromoterephthalate consisting of recurring units of the formula



where n = 2, 3 or 4, and x = about 3 to 25, with said polyalkylene-2,5-dibromoterephthalate exhibiting no propensity to exude from said physical admixture during utilization of a three-dimensional article molded therefrom at an elevated temperature of 175° C. for 66 hours and with said composition when molded being self-extinguishing and non-dripping when subjected to the UL-94 Flammability Test.

4,024,103

STABILIZED POLYOLEFIN MOLDING COMPOSITION

Rudolf Heinrich, Fischbach, Taunus, and Hans-Jerg Kleiner, Kronberg, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

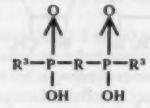
Filed Sept. 2, 1975, Ser. No. 609,675

Claims priority, application Germany, Sept. 4, 1974, 2442390

Int. Cl.² C08K *5/53*

U.S. Cl. 260—45.7 P **5 Claims**

1. A molding composition of a polyolefin and from 0.01 to 2 weight %, based on the weight of polyolefin, of a compound of the formula



in which

R is alkylene of 1 to 18 carbon atoms or arylene,

R^3 is alkyl of 1 to 18 carbon atoms, aryl or alkylaryl of 6 to 18 carbon atoms, or OH, and/

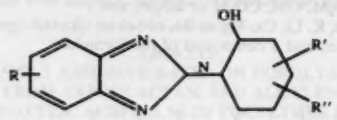
R^3 may also be substituted by halogen or OH.

4,024,104
STABILIZED ETHYLENE-CARBON MONOXIDE COPOLYMERS

Donald Henry Russell, Cherry Hill, N.J., and Robert Warren Lenton, Glenolden, Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed June 13, 1975, Ser. No. 587,002
Int. Cl.² C08K 5/00
U.S. Cl. 260—45.8 R 9 Claims

1. A stabilized ethylene-carbon monoxide copolymer composition containing about 0.1 to 20% based on the weight of polymer in the composition of a stabilizer system comprised of at least one compound having the structural formula:



wherein R, R′ and R″ are the same or different radicals or atoms selected from the group consisting of H, halogen, cyclohexyl and straight or branched-chain alkyl radicals having up to 8 carbon atoms.

4,024,105
PROCESS FOR PREPARING A STABILIZED OXYMETHYLENE COPOLYMER

Günter Sextro; Karlheinz Burg, both of Naurod, Taunus, and Ernst Wolters, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 20, 1975, Ser. No. 551,235
Claims priority, application Germany, Feb. 22, 1974, 2408481
Int. Cl.² C08G 2/32, 2/10
U.S. Cl. 260—45.85 R 9 Claims

1. A process for preparing an oxymethylene copolymer having heat and hydrolysis resistant terminal groups by heating a copolymer consisting of from 80 to 99.9% by weight of units derived from cyclic oligomer of formaldehyde and from 20 to 0.1% by weight of units derived from a compound capable of being copolymerized with the said oligomer and forming monomer units having from 2 to 8 adjacent carbon atoms, which comprises heating the copolymer in a liquid phase at a temperature of 130° to 200° C. in the presence of 100 to 2,500 ppm, based on the total weight of said liquid phase, of at least one magnesium or calcium salt of a mono- or dicarboxylic acid having 3, 4 or 5 carbon atoms at a pressure above atmospheric pressure in the absence of oxygen.

4,024,106
2,4-DIHYDROXY-4-PENTADECYL BENZOPHENONE AND COMPOSITIONS CONTAINING THE SAME

Roger A. Mader, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 17, 1975, Ser. No. 632,363
Int. Cl.² C07C 49/82; C08K 5/13
U.S. Cl. 260—45.95 F 11 Claims

1. A composition comprising a thermoplastic resin which is normally subject to degradation upon prolonged exposure to ultraviolet light rays and a small but effective amount of 2,4′-dihydroxy-4-pentadecyl benzophenone to inhibit said degradation.

11. 2,4′-dihydroxy-4-pentadecyl benzophenone.

4,024,107
METHOD OF SEPARATING A COPPER-AMINE CATALYST FROM A POLYPHENYLENE ETHER REACTION MIXTURE

James Gordy Bennett, Jr., and Glenn Dale Cooper, both of Delmar, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed May 12, 1975, Ser. No. 576,677
Int. Cl.² C08G 65/44, 65/46
U.S. Cl. 260—47 ET 9 Claims

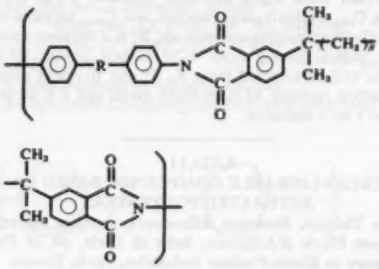
1. In a process for forming a polyphenylene ether by an oxidative coupling reaction in the presence of a complex copper-amine catalyst comprising passing an oxygen-containing gas through a reaction solution of a phenol and said catalyst, the improvement which comprises separating said catalyst by adding an amount of 2,2′-dipyridyl to said reaction solution which is sufficient to form an insoluble complex with said copper-amine complex and thereafter separating by filtration or centrifugation said insoluble complex from said reaction solution.

4,024,108
ALKYLENE-LINKED AROMATIC POLYIMIDES

Larry F. Charbonneau, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 22, 1975, Ser. No. 615,588
Int. Cl.² C06G 73/10
U.S. Cl. 260—47 CP 3 Claims

1. A thermally stable and melt processible alkylene-linked polyimide resin consisting essentially of repeating mer units of the following structural formula:



wherein R is oxygen, carbonyl, or a divalent alkylene group having from 1 to 4 carbon atoms and *n* may vary from 3 to 18, or R may be absent.

4,024,109
PROCESS FOR PREPARING CURED EPOXIDE POLYMERS

Martin Cherubim, Rheinkamp-Eick, Germany, assignor to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Continuation of Ser. No. 427,865, Dec. 26, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,420
Claims priority, application Germany, Dec. 30, 1972, 2264286
Int. Cl.² C08G 30/16
U.S. Cl. 260—47 EN 5 Claims

1. The process which consists essentially of curing a composition essentially of an epoxide compound containing more than one 1,2epoxide group with 0.03-1 mole per 1 epoxide equivalent of 1,3,6,8-tetraaza-tricyclo-[4,4,1^{1,6}.1^{3,8}]-dodecane thereby forming a cured compound; and

recovering said cured compound.

4,024,110
METHOD FOR MAKING POLYETHERIMIDES

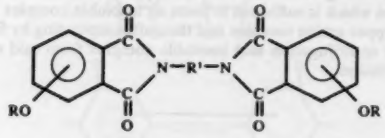
Tohru Takekoshi, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 5, 1975, Ser. No. 637,948
Int. Cl.² C08G 65/42, 73/10
U.S. Cl. 260—47 CZ **8 Claims**

1. A method for making polyetherimides which comprises,
1. effecting the removal at temperatures up to 350° C of monohydric phenol of the formula,

ROH,

from a mixture comprising,
A. a bisimide of the formula,



B. a dihydric phenol of the formula,

HOR^2OH, and

C. an alkali phenoxide of the formula,

$R^3(OH)n$,

where there is used from 1 to 4 mols of (A) per mole of (B) and from 0.1 to 10% by weight of (C), based on the weight of (A), (B) and (C), R is a monovalent aromatic organic radical having from 6–13 carbon atoms, R^1 is a divalent organic radical selected from $C_{(6-13)}$ aromatic radicals, $C_{(2-8)}$ alkylene radicals, $C_{(3-8)}$ cycloalkylene radicals, and $C_{(2-8)}$ alkylene terminated polydiorganosiloxane radicals, R^2 is a divalent aromatic organic radical having from 6–30 carbon atoms, R^3 is an aromatic radical selected from R, R^2 and trivalent aromatic hydrocarbon radicals, M is an alkali metal and *n* is an integer equal to 1 to 3 inclusive.

4,024,111
CROSS-LINKABLE COMPOUNDS BASED ON SATURATED POLYESTERS

Philippe Thomas, Boulogne Billancourt; Jacques Meyer, and Jacques Marie d'Avigneau, both of Paris, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Dec. 15, 1975, Ser. No. 640,479
Claims priority, application France, Dec. 24, 1974, 74.42685
Int. Cl.² C08G 63/20, 63/46, 63/76
U.S. Cl. 260—75 T **9 Claims**

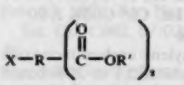
1. A binder comprising a saturated polyester with terminal hydroxyl groups and a cross-linking agent, characterized in that the polyester has a softening temperature within the range of 70 ° to 130 ° C, a hydroxyl number within the range of 150 to 250 and an acid number below 10, and that the cross-linking agent comprises a dianhydride with ester groups, which is the product of a reaction between trimellitic anhydride and a diol and which has a softening temperature within the range of 60 ° to 130 ° C.

4,024,112
POLYESTERS CONTAINING IONIC GROUPS

Robert Bernard Login, Woodhaven, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

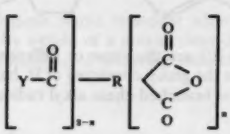
Filed Dec. 22, 1975, Ser. No. 642,846
Int. Cl.² C08G 63/40
U.S. Cl. 260—75 N **11 Claims**

1. A polyester containing ionic groups prepared by the reaction of (a) an alkylene oxide adduct of a nitrogen-containing compound having a molecular weight from about 1,000 to 40,000 and an alkylene oxide content of from about 60% to 90% by weight, said alkylene oxide content being at least 10% by weight ethylene oxide, with (b) a compound of the formula:



I.

wherein
R is an aliphatic or aromatic radical,
R′ is an alkyl group having from 1 to 4 carbon atoms,
X is SO_3M, OM, CO_2M or SO_3M, and
M is Na, K, Li, Ca, Mg or Ba, or (c) an alkoxide-generating reagent and a compound of the formula:



II.

wherein
R is an aliphatic or aromatic radical,
Y is Cl or alkyl having from 1 to 4 carbon atoms, and
n = 1 or 2 employing an equivalent ratio of ester group of (b) or (c) to hydroxyl group of (a) of from about 0.25:1 to 0.5:1.

4,024,113
POLYCARBONATE POLYURETHANES BASED ON PARTICULAR ALIPHATIC/CYCLOALIPHATIC POLYCARBONATES

Vernon G. Ammons, Glenshaw, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 28, 1976, Ser. No. 681,013
Int. Cl.² C08G 18/42, 63/62; B32B 27/40
U.S. Cl. 260—77.5 AM **17 Claims**

9. A transparent, energy-absorbing polyurethane which is the reaction product of:
a. an organic diisocyanate;
b. an organic compound having two isocyanate-reactive hydrogens and a molecular weight less than about 250; and
c. a polycarbonate diol prepared from a mixture of linear aliphatic and cycloaliphatic diols.

4,024,114
COPOLYAMIDES DERIVED FROM CYCLOHEXANEBIS(ETHYLAMINE)

James S. Ridgway, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 752,769, Aug. 15, 1968, abandoned. This application Sept. 15, 1971, Ser. No. 180,911
Int. Cl.² C08G 69/28
U.S. Cl. 260—78 R **3 Claims**

1. A fiber-forming polycarbonamide consisting essentially of the polymeric condensation product of a diacid of the formula HOOC-R-COOH and a mixture of diamines consisting essentially of 1,4-cyclohexanebis(ethylamine) and a diamine of the formula NH_2-R-NH_2 in a mole ratio of 3:2, respectively, wherein R represents the radical $-(CH_2)-_n$ in which *n* is an integer from 4 to 20.

4,024,115
MANUFACTURE OF POLYAMIDE FILM CONTAINING ESTER OF AN ALIPHATIC ALCOHOL

Erwin Zahn, Ludwigshafen; Claus Cordes, Weisenheim; Georg Nikolaus Simon, Limburgerhof, and Hans-Peter Weiss, Altrip, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Oct. 14, 1975, Ser. No. 622,103

Claims priority, application Germany, Oct. 25, 1974, 2450788

Int. Cl.² C08G *69/46*

U.S. Cl. 260—78 S **6 Claims**

1. A polyamide film consisting essentially of a hexamethylenediamine adipate polymer and additionally containing from 0.01 to 2 percent by weight based on the polymer, of an ester of octanol with adipic acid or p-hydroxybenzoic acid.

4,024,116
HOT-MELT ADHESIVE BASED ON COPOLYAMIDES FROM CAPROLACTAM AND ALKYLENE DICARBOXYLIC ACID SALTS OF POLYETHER DIAMINE

Peter Horn, Ludwigshafen, and Hans-Dietmar Haertl, Bruehl, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Sept. 8, 1975, Ser. No. 610,979

Claims priority, application Germany, Sept. 21, 1974, 2445167

Int. Cl.² C08G *69/14*

U.S. Cl. 260—78 L **3 Claims**

1. A hot-melt adhesive consisting essentially of a copolyamide of

A. from 20 to 60 parts by weight of ε-caprolactam,

B. from 10 to 40 parts by weight of a salt of adipic acid, sebacid acid, azelaic acid or mixtures thereof with a diamine of the general formula

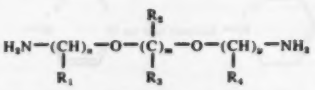
$$H_2N-(CH_2)_n-NH_2 \quad (I)$$

in which n is a whole number from 2 to 6, and

C. from 20 to 60 parts by weight of a salt of a dicarboxylic acid of the general formula

$$HOOC-(CH_2)_n-COOH \quad (II)$$

in which n is a whole number from 7 to 11, with a diamine of the general formula



(III)

in which n, m and y are identical or different and each is from 2 to 6 and the individual radicals R_1, R_2, R_3 and R_4 are identical or different and each is H or alkyl of 1 to 3 carbon atoms.

4,024,117
HYDROCURABLE COMPOSITIONS OF HYDROXY(POLYALKYLENECARBONYLOXY)-ALKYLENEOXAZOLIDINE AND AN ISOCYANATE

William D. Emmons, Huntingdon Valley, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 425,007, Dec. 14, 1973, Pat. No. 3,912,691. This application Apr. 21, 1975, Ser. No. 569,739

Int. Cl.² C08G *63/02*

U.S. Cl. 260—78.3 R **6 Claims**

1. A compound of the formula:

wherein R^1 is hydrogen, mononuclear aryl, aralkyl or alkyl; R^2 is hydrogen or alkyl or R^1 and R^2 are joined together with the carbon atom to which they are attached to form cycloalkyl; R^3 is hydrogen, alkyl, cycloalkyl, alkoxy or mononuclear aryl; R^1, R^2 and R^3 may be substituted with halo, lower alkoxy, hydroxy, amino or nitro; Y is unsubstituted or substituted lower alkylene; X is substituted or unsubstituted lower alkylene; n is an integer of at least 4; z is an integer of 1–50 and Z is a polyvalent organic isocyanate residue.

4,024,118
p-PHENYLENE SULFIDE POLYMERS

Robert W. Campbell, and Harold D. Yelton, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 27, 1975, Ser. No. 581,337

Int. Cl.² C08G *75/16*

U.S. Cl. 260—79.1 **13 Claims**

1. A method for producing polymer in a molecular weight range capable of being molded into usable film said method comprising:

a. contacting at least one p-dihalobenzene, at least one organic amide, lithium sulfide and additional alkali metal sulfide chosen from the group comprising sodium sulfide, potassium sulfide, rubidium sulfide, cesium sulfide, and mixtures thereof to form a composition; and

b. maintaining at least a portion of said composition at polymerization conditions to produce a polymer.

4,024,119
POLYSULFONE RESINS CONTAINING BIBENZYL SULFONE REPEATING UNITS

Fred Max Sonnenberg, Worcester, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.

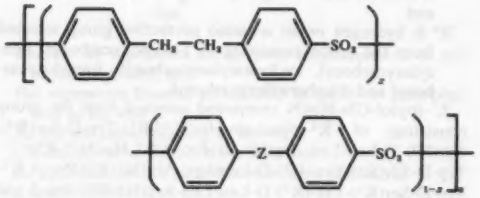
Filed Jan. 12, 1976, Ser. No. 648,445

Int. Cl.² C08F *28/02*; C08G *75/20*

U.S. Cl. 260—79.3 A **18 Claims**

1. A homopolymer of bibenzyl sulfone.

2. A copolymer containing the following structural units:



wherein: $0.01 \quad x \quad 0.99$; and

x equals the molar ratio of bibenzyl 4-sulfone units present in the total polymer weight;

n equals the degree of polymerization; and

Z is selected from the group consisting of a direct link, oxygen, sulfur, lower alkylidene, or lower alkyl other than ethylene having from about 1 to 5 carbon atoms.

4,024,120
PROCESS FOR PRODUCING BLAND, PROTEIN ENRICHED PRODUCTS FROM GRAIN GLUTEN

Robert Dixon Phillips, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Aug. 4, 1975, Ser. No. 601,470

Int. Cl.² A23J *1/12*

U.S. Cl. 260—112 G **7 Claims**

1. A process for the preparation of a bland, protein enriched product, which comprises:

a. contacting crude grain gluten with a solvent containing about 70 to 100 percent ethyl acetate, 0 to 15 percent aliphatic alcohol having 1 to 4 carbon atoms, and 0 to 30 percent water, wherein the percentages are by weight based upon the total weight of solvent;
b. separating the gluten from the solvent;
c. washing the separated gluten with water;
d. separating the washed gluten from the water; and
e. drying the washed gluten product.

4,024,121
(PYRO)-GLU-HIS-TRP-D-SER-TYR-D-LEU-LEU-ARG-PRO-NHR AND INTERMEDIATES

Andrew V. Schally, 2500 Whitney Place, Apt. 319, Bldg. 2, Metairie, La. 70002, and David H. Coy, 4319 Perrier St., New Orleans, La. 70115

Filed Jan. 27, 1976, Ser. No. 652,945
Int. Cl.² C07C *103/52;* **A61K** *37/00*
U.S. Cl. 260—112.5 LH **8 Claims**

1. A compound of formula 1

(pyro)-Glu-His-Trp-D-Ser-Tyr-D-Leu-Arg-Pro-NHR (1)

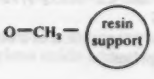
in which R is lower alkyl, or a non-toxic pharmaceutically acceptable salt thereof.

3. A compound of the formula

R⁵-(pryo)-Glu-His-Trp-D-Ser(R⁴)-Tyr(R³)-D-Leu-Leu-Arg-(N^G-R²)-Pro-NHR

in which R is lower alkyl;
R^2 is a protective group for the N , N , N nitrogen atoms of arginine selected from the group consisting of tosyl, nitro, benzyloxycarbonyl and adamantyloxycarbonyl;
R^3 is a protective group for the hydroxyl of tyrosine selected from the group consisting of 2-bromobenzyloxycarbonyl, benzyl, acetyl, tosyl, benzoyl, t-butyl, tetrahydropyran-2-yl, trityl, 2,4-dichlorobenzyl and benzyloxycarbonyl;
R^4 is a protective group for the hydroxyl group of serine and is selected from the group defined hereinbefore for R^3; and
R^6 is hydrogen or an α-amino protective group selected from the group consisting of t-butyloxycarbonyl, benzyloxycarbonyl, cyclopentyloxycarbonyl, t-amyloxycarbonyl and d-isobornyloxycarbonyl.

7. -(pyrol-Glu-His(N compound selected from the group consisting of R^6-(pyro)-glu-His(N^1m-R^5)-Trp-D-Ser(R^4)-Tyr(R^3)-D-Leu-Leu-Arg(N^G-R^2)Pro-A,R^7-His(N^1m-R^5)-Trp-D-Ser(R^4)-Tyr-(R^3)-D-Leu-Leu-Arg(N^G-R^2)-Pro-A,R^7-Trp-D-Ser(R^4)-Tyr-(R^3)-D-Leu-Leu-Arg(N^G-R^2)-Pro-A and R^7-D-Ser(R^4)-Tyr(R^3)-D-Leu-Leu-Arg(N^G-R^2)-Pro-A, in which
R^2 is protective group for the N , Nω, Nω' nitrogen atoms of arginine selected from the group consisting of tosyl, nitro, benzyloxycarbonyl and adamantyloxycarbonyl;
R^3 is a protective group for the hydroxyl of tyrosine selected from the group consisting of 2-bromobenzyloxycarbonyl, benzyl, acetyl, tosyl, benzoyl, t-butyl, tetrahydropyran-2-yl, trityl, 2,4-dichlorobenzyl and benzyloxycarbonyl;
R^4 is a protective group for the hydroxyl group of serine and is selected from the group defined hereinbefore for R^3;
R^5 is a protective group for the imidazole nitrogen atoms of histidine selected from the group of dinitrophenyl and tosyl; wherein R is lower alkyl, R^6 is hydrogen or an α-amino protective group, R^7 is an α-amino protective group, and A is



4,024,122
METHOD OF PURIFYING 2,4-BIS(6-DIAZO-5,6-DIHYDRO-5-OXO-1-NAPHTHALENESULFONYLOXY BENZOPHENONE)

Daniel Louis Ross, Princeton, and Lucian Anthony Barton, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 332,025, Feb. 12, 1973, Pat. No. 3,852,771. This application Sept. 11, 1974, Ser. No. 505,073
Int. Cl.² C07C *113/00;* **C07B** *21/00, 29/00;* **B01D** *9/00*
U.S. Cl. 260—141 **3 Claims**

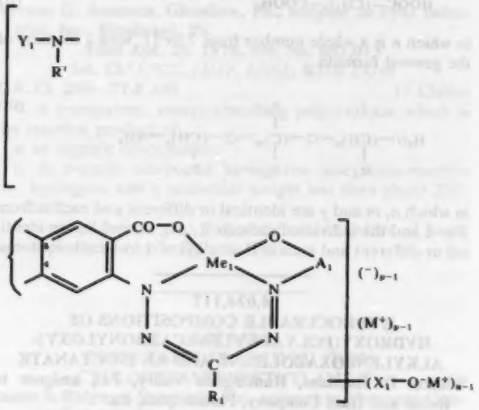
1. A method of purifying 2,4-bis(6-diazo-5,6-dihydro-5-oxo-1-naphthalenesulfonyloxy)benzophenone which comprises partially dissolving a crude reaction product obtained by reacting 2,4-dihydroxybenzophenone with at least two equivalents of 2-diazo-1-naphthol-5-sulfonyl chloride in an organic solvent for 2,4-bis(6-diazo-5,6-dihydro-5-oxo1-naphthalenesulfonyloxy)benzophenone, reprecipitating the product by addition of an organic nonsolvent selected from the group consisting of n-hexane and cyclohexane and recrystallizing the reprecipitated product from acetonitrile, 2-butanone or nitromethane.

4,024,123
FIBER-REACTIVE, HEAVY METAL-CONTAINING FORMAZANE DYESTUFFS

Paul Dussy, 49, Gruthweg, Munchenstein, and Hans Ackermann, 11, Bierastrasse, Bottmingen, both of Switzerland

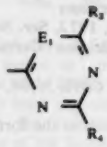
Continuation of Ser. No. 271,616, July 13, 1972, abandoned, which is a continuation of Ser. No. 89,502, Nov. 13, 1970, abandoned, which is a continuation of Ser. No. 795,035, Jan. 28, 1969, abandoned, which is a continuation-in-part of Ser. No. 653,611, July 17, 1967, abandoned. This application Mar. 7, 1974, Ser. No. 449,205
Claims priority, application Switzerland, July 21, 1966, 10582/66; Jan. 29, 1968, 1330/68; Jan. 29, 1968, 1327/68
Int. Cl.² C09B *62/08, 62/16, 62/24, 62/50*
U.S. Cl. 260—146 D **19 Claims**

1. A dyestuff of the formula

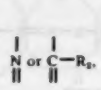


wherein
Me_1 represents Cu, Ni, Co or Cr,
A_1 represents a benzene nucleus or naphthalene nucleus substituted as shown above and further substituted by hydrogen, fluorine, chlorine or bromine, nitro, cyano, lower alkyl, phenoxy, lower alkylsulphonyl, phenysulphonyl, sulphamoyl, N-mono-lower alkyl-sulphamoyl, N,N-di-lower alkyl-sulphamoyl, or lower alkanoyl,
R_1 represents a phenyl or naphthyl radical any substituent of which apart from any substituent (X_1-O^-M^+) is selected from chlorine, bromine, lower alkyl or hydrogen,

R′ represents hydrogen or lower alkyl,
X_1 represents $-SO_2-$ or $-CO-$,
M^+ represents hydrogen, sodium or potassium,
p represents 1 when Me_1 is Cr, and 2 when Me_1 is Cu, Co or Ni,
n represents a number varying from 1 to 7, and
Y_1 represents a fiber reactive grouping selected from
a. a radical of the formula

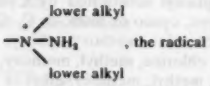


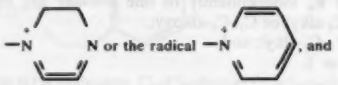
wherein
E_1 represents



and, when E_1 is

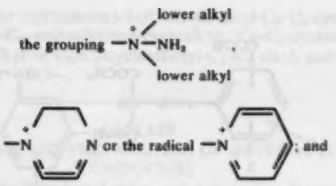
either
i. R_3 represents chlorine, tri-lower alkyl-ammonio, a group of the formula



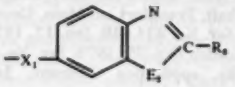


R_4 represents a lower alkoxy, phenoxy, amino, mono-lower alkyl-amino, di-lower alkyl-amino, phenylamino, sulphophenylamino or di-sulpho-phenylamino; or
ii. both R_3 and R_4 represent chlorine, bromine or fluorine, and, when E_1 is

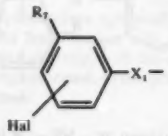
R_2 represents hydrogen, fluorine, chlorine, bromine, lower alkyl, lower alkanoyl, cyano, nitro, phenyl, N-phenyl-carbamoyl or phenylsulphonyl, and each of R_3 and R_4 represents fluorine, chlorine or bromine;
b. a radical of one of the formulas T,1100
wherein R_3' represents hydrogen or chlorine and either
i. each of R_3' and R_4' represents chlorine or $-SO_3^-M^+$, or
ii. R_3' represents lower alkoxy, phenoxy, amino, mono-lower alkyl-amino, di-lower alkyl-amino, phenylamino, sulphophenylamino or diulphophenylamino, and R_4' represents tri-lower alkyl-ammino,



R_5 represents hydrogen or lower alkyl;
c. 2,3-dichloro- or 2,3-dibromo-quinoxaline-6-carbonyl;
d. 2,3-dichloro- or 2,3-dibromo-quinoxaline-6-sulphonyl;
e. 1,4-dichloro- or 1,4-dibromo-phthalazine-6-carbonyl;
f. 2,4-dichloro- or 2,4-dibromo-quinazoline-6-carbonyl;
g. 2,4-dichloro- or 2,4-dibromo-quinazoline-7-carbonyl;
h. [4′,5′-dichloro- or 4′,5′-dibromo-6′-pyridazonyl (1′)]-lower alkanoyl;
i. p-[4′,5′-dichloro- or 4′,5′-dibromo-6′-pyridazonly-(1′)]-benzoyl;
j. a heterocyclic radical of the formula



wherein R_6 represents chlorine, bromine or $-SO_3M^+$,
X_1 has the same meanings as given above; and
E_2 represents sulphur or oxygen;
k. a radical of the formula



wherein R_7 represents nitro, lower alkylsulphonyl or sulphamoyl-phenyl, and
Hal represents fluorine or chlorine in ortho- or para-position to R_7, and
X_1 has the same meaning as above;
l. α-chloro- or α-bromo-lower alkanoyl;
m. α, β-dichloro- or α, β-dibromo-lower alkanoyl;
n. lower alkanoyl; or
o. chloro- or bromo-lower alkenoyl

4,024,124

MONOAZO ACETOACETYLAMINOBENZIMIDAZOLONE PIGMENTS CONTAINING CARBOXY GROUP

Joachim Ribka, Offenbach am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

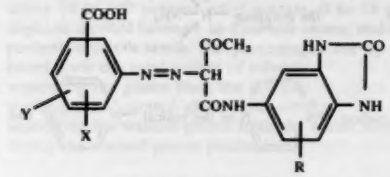
Continuation-in-part of Ser. No. 280,085, Aug. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 58,698, July 27, 1970, abandoned. This application June 14, 1974, Ser. No. 479,563

Claims priority, application Germany, Aug. 2, 1969, 1939466

Int. Cl.[2] C09B 29/36

U.S. Cl. 260—157 **7 Claims**

1. A water-insoluble azo dyestuff of the formula



wherein X is hydrogen, chlorine, bromine, methyl, lower alkoxy, trifluoromethyl or nitro, Y is hydrogen, chlorine, carboxylic acid, carboxylic acid methyl ester, carboxylic acid amide, carboxylic acid lower alkyl amide, carboxylic acid phenyl amide or carboxylic acid dichlorophenyl amide, and R is hydrogen, chlorine, bromine, methyl or lower alkoxy.

4,024,125

DIS-AZO PIGMENTS DERIVING FROM BIS-DIAZOTIZED DIAMINO-2-PHENYL-BENZAZOLONES

Walter Kunstmann, Neuenhain, Taunus, and Joachim Ribka, Offenbach am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

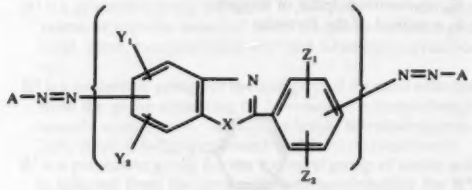
Continuation of Ser. No. 434,040, Jan. 17, 1974, abandoned. This application Oct. 29, 1975, Ser. No. 626,836

Claims priority, application Germany, Jan. 19, 1973, 2302522

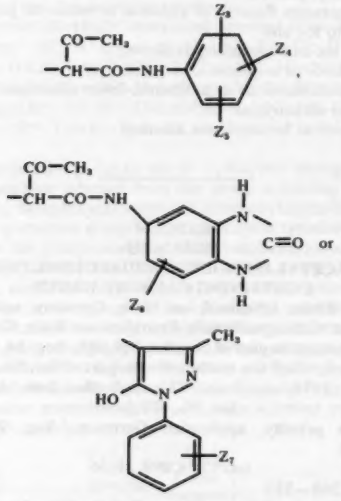
Int. Cl.² C09B *35/34*

U.S. Cl. 260—157 **6 Claims**

1. A compound of the formula



wherein X is sulfur, oxygen or —NR—, R is hydrogen or alkyl of 1 to 4 carbon atoms, A is



Y_1, Y_2, Z_1, Z_2, Z_3, Z_4, Z_5, Z_6 and Z_7 are hydrogen, chlorine, bromine, methyl, ethyl, methoxy or ethoxy.

4,024,126

ARYL- OR ALKYL-SULPHONYL AMINOSULPHONYLPHENYL-AZO-ARYLENE-AZO-PHENYL DYESTUFFS

Richard Sommer, Leverkusen, and Gerhard Wolfrum, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

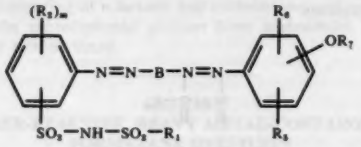
Filed July 10, 1972, Ser. No. 270,010

Claims priority, application Germany, July 10, 1971, 2134498

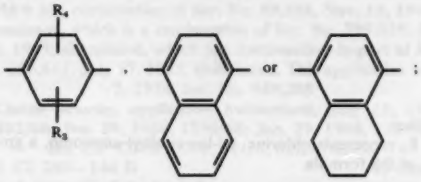
Int. Cl.² C09B *31/06, 43/18*

U.S. Cl. 260—186 **8 Claims**

1. Disazo dyestuff, which in the form of the free acid, has the formula



B is



R_1 is phenyl; phenyl substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, cyano or nitro; or C_1–C_4-alkyl;
R_2 is chlorine, bromine, methoxy, ethoxy, methyl or ethyl;
R_3 is hydrogen, chlorine, methyl, methoxy, ethyl or ethoxy;
R_4 is hydrogen, methyl, methoxy, ethyl or ethoxy;
R_5 and R_6 independently of one another are hydrogen, C_1–C_4-alkyl or C_1–C_4-alkoxy;
R_7 is C_1–C_4-alkyl; and
m is 0 or 1.

4,024,127

PROCESS FOR THE PREPARATION OF 5-ALKYL-10-AMINO-DIHYDRODIBENZOAZEPINES

André Blind, and Hubert Linares, both of Rhone, France, assignors to Rhone-Poulenc S.A., Paris, France

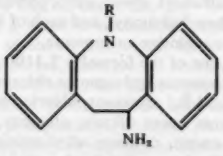
Filed Sept. 11, 1973, Ser. No. 396,143

Claims priority, application France, Sept. 12, 1972, 72.32287

Int. Cl.² C07D *223/22*

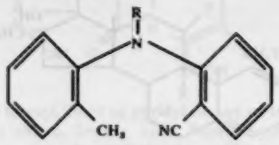
U.S. Cl. 260—239 D **11 Claims**

1. Process for the preparation of a 5-alkyl-10-amino-10,11-dihydrodibenzo[b,f]azepine of the formula:

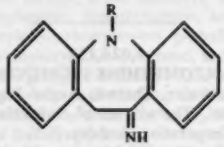


(wherein R represents alkyl of 1 through 5 carbon atoms)

which comprises reacting an N-alkyl-N-o-tolylanthranilonitrile of the formula:



(wherein R is as hereinbefore defined) with an alkali metal amide of a secondary amine, in a proportion of at least one mole of said amide per mole of the said nitrile, said reaction being carried out in an inert organic solvent, and converting the imino radical in the resulting 10-imino-10,11-dihydrodibenzo[b,f]azepine of the formula:



(wherein R is as hereinbefore defined) to the amino radical by catalytic hydrogenation.

4,024,128
BENZAZEPINYL SULFONYLUREAS AND INTERMEDIATES THEREFORE

Wolfgang Koch, Benken, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

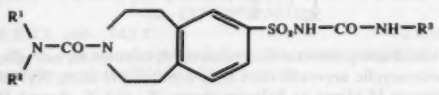
Filed Feb. 13, 1975, Ser. No. 549,572

Claims priority, application Switzerland, Feb. 22, 1974, 2539/74

Int. Cl.² C07D *223/16*

U.S. Cl. 260—239 BB **15 Claims**

1. A compound of the formula

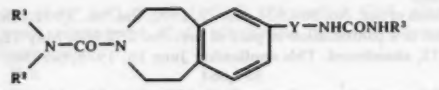


I

wherein R^1 is hydrogen, C_1–C_6-alkyl or C_5–C_8-cycloalkyl; R^2 is C_1–C_6-alkyl or C_5–C_8-cycloalkyl, or R^1 and R^2, taken together with the nitrogen atom to which they are attached, are a pyrrolidine ring; and R^3 is C_1–C_8-alkyl, C_5–C_8-alkenyl-alkyl, C_5–C_8-cycloalkyl, (2 or 3)-(cyclopenten or cyclohexen)-1-yl, C_1–C_4-alkyl substituted (2 or 3)-(cyclopenten or cyclohexen)-1-yl, C_1–C_4-alkyl-C_5–C_8-cycloalkyl, C_7–C_{10}-endoalkylene-cycloalkyl, C_5–C_8-cycloalkyl-C_1–C_4-alkyl or C_5–C_8-cycloalkenyl-C_1–C_4-alkyl,

or physiologically or pharmaceutically acceptable salt thereof.

12. A sulfenylurea or sulfinylurea of the formula



XIII

wherein R^1 is hydrogen, C_1–C_6-alkyl or C_5–C_8-cycloalkyl, R^2 is C_1–C_6-alkyl or C_5–C_8-cycloalkyl, or R^1 and R^2, taken together with the nitrogen atom to which they are attached, are a pyrrolidine ring; R^3 is C_1–C_8-alkyl, C_5–C_8-alkenylalkyl, C_5–C_8-cycloalkyl, (2 or 3)-(cyclopenten or cyclohexen)-1-yl, C_1–C_4-alkyl substituted (2 or 3)-(cyclopenten or cyclohexen)-1-yl, C_1–C_4-alkyl-C_5–C_8-cycloalkyl, C_7–C_{10}-endoalkylene-cycloalkyl, C_5–C_8-cycloalkyl-C_1–C_4-alkyl or C_5–C_8-cycloalkenyl-C_1–C_4-alkyl; and Y is —S— or —SO—.

4,024,129
PROCESS FOR THE PREPARATION OF HETEROCYCLIC COMPOUNDS

Peter Wolfgang Henniger, Leiden, and Antoon Van Harrewijn, Delft, both of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands

Filed Nov. 3, 1971, Ser. No. 195,488

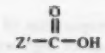
Claims priority, application United Kingdom, Nov. 6, 1970, 53039/70

Int. Cl.² C07D *499/04*, *501/02*

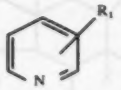
U.S. Cl. 260—239.1 **10 Claims**

1. A process for the preparation of acylamides comprising reacting an isocyanate compound of the formula

wherein Z is selected from the group consisting of alkyl of 1 to 7 carbon atoms, phenyl, naphthyl, cycloalkyl of 5 to 8 carbon atoms and mono- and binuclear heterocycles containing one or more heteroatoms selected from the group consisting of oxygen, nitrogen and sulphur, optionally substituted with at least one members selected from the group consisting of halogen atom, a nitro-, cyano-, phenoxy-, alkoxy- and alkylmercapto having 1 to 7 carbon atoms, phenylmercapto, esterified carboxyl, esterified hydroxyl, acylamino and a carbamoyl-group optionally substituted with alkyl groups of 1 to 7 carbon atoms, phenyl and phenylalkyl, with a carboxylic acid of the formula



wherein Z' is an hydrocarbon optionally substituted with at least one substituent less reactive with the isocyanato compound than the carboxyl group, with the carbon atom α-to the carboxyl group being saturated, in the presence of at least one catalyst of the formula



wherein R is at least one electron releasing group selected from the group consisting of alkoxy of 1 to 7 carbon atoms, phenoxy, phenyl lower alkoxy, silyloxy, di lower alkylamino and silyl lower alkylamino of 1 to 7 carbon atoms and disilylamino with the proviso that there are not electron releasing groups in both the 2- and 6-positions and *n* is 1, 2 or 3 and N-oxides thereof.

4,024,130
PROCESS FOR THE MANUFACTURE OF ALKALI METAL SALTS OF 6-[2-PHENYL-2-(IMIDOYLAMINOALKANOYLAMINO)ACETAMIDO]PENICILLANIC ACIDS

John G. Stam, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,846

Int. Cl.² C07D *499/70*

U.S. Cl. 260—239.1 **8 Claims**

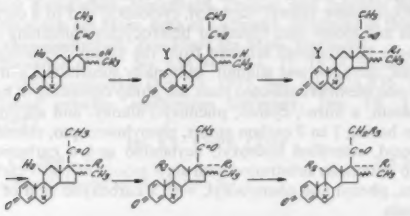
1. A process for the preparation of alkali metal salts of 6-[2-phenyl-2-(imidoylaminoalkanoylamino)acetamido]-penicillanic acids which comprises treating a primary, secondary or tertiary amine salt of said penicillanic acid, said amine having a total of at least six carbon atoms, in a reaction inert

solvent with an alkali metal salt selected from the group consisting of alkali metal iodides, phenoxides, alkoxides having from one to four carbon atoms, thiocyanates, alkanoates having from two to eight carbon atoms in the alkyl group and alkyl acetoacetates having from 1 to 4 carbon atoms in the alkyl group.

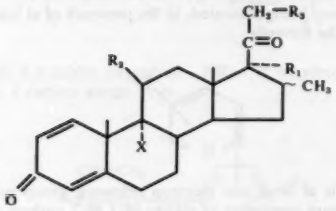
4,024,131
16-METHYL-9α-HALO STEROID ESTERS, ETHERS AND PREPARATION THEREOF

Joao Emerico Villax, Lisbon, Portugal, assignor to Pluripharmie Anstalt, Vaduz, Liechtenstein

Filed Mar. 25, 1975, Ser. No. 561,948
Claims priority, application Portugal, Mar. 27, 1974, 61636; Mar. 27, 1974, 61637
Int. Cl. C07j *5/00, 17/00*
U.S. Cl. 260—239.55 R **30 Claims**

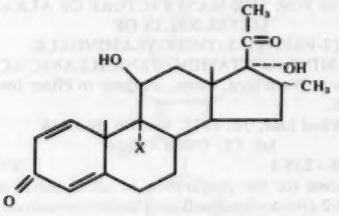


1. A process for the preparation of 16-methyl-9α-chloro or fluoro steriod compounds of high topical and/or protracted activity of the formula



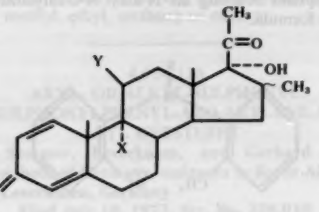
(III)

wherein X is chlorine or fluorine, R_1 and R_2 are hydroxyl or esterified hydroxyl provided at least one of R_1 and R_2 is esterified hydroxyl, R_3 is hydrogen, hydroxy or an esterified hydroxy group, comprising (A) selectively protecting the 11α-hydroxy of a compound of the formula



(IV)

wherein X is chlorine or fluorine, with a tetrahydropropyranyl group to obtain a compound of the formula



(V)

wherein Y is said tetrahydropyanyl group; and therafter (B) esterifying the 17α-hydroxyl group; whereby an 11α-protected 17α-monoester is obtained.

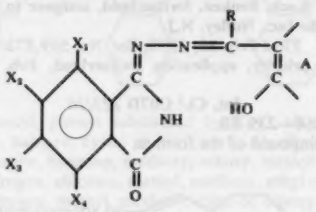
30. An ester of 16-methyl-9α-chloro-11β(tetrahydropyran-2'-yloxy) prednisolone selected from the group consisting of 17-propionate, 17-valerate, 17,21-dipropionate and 17,21-divalerate.

4,024,132
AZOMETHINE PIGMENTS

Francois L'Eplattenier, Therwil; André Pugin, Riehen, and Laurent Vuitel, Therwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 502,246, Aug. 30, 1974, Pat. No. 3,974,149. This application June 7, 1976, Ser. No. 693,388
The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.
Int. Cl.² C09B *55/00*
U.S. Cl. 260—240 G **8 Claims**

1. Azomethine pigments of the formula



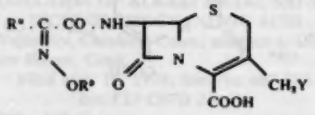
and metal complexes thereof, wherein A denotes an isocyclic or heterocyclic aromatic radical, R denotes a H atom, X_2 and X_4 denote H atoms or halogen atoms, X_1 and X_3 denote H atoms or halogen atoms, alkoxy or alkylmercapto groups containing 1–6 C atoms, cycloalkoxy groups containing 5–6 C atoms, or aralkoxy, aryloxy or arylmercapto groups, it being possible for one of the substituents X_1–X_4 also to be a nitro group.

4,024,133
7β-[2-ETHERIFIED OXIMINO-2-(THIENYL-,FURYL- OR PYRIDYLACETAMIDO)]CEPHALOSPORINS

Martin Christopher Cook; Gordon Ian Gregory, both of Chalfont St. Peter, and Janice Bradshaw, Harrow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

Division of Ser. No. 304,524, Nov. 7, 1972, Pat. No. 3,971,778, which is a continuation-in-part of Ser. No. 252,666, May 12, 1972, abandoned. This application June 16, 1975, Ser. No. 587,064
Claims priority, application United Kingdom, May 14, 1971, 15082/71; Oct. 1, 1971, 45884/71
Int. Cl.² C07D *501/20*
U.S. Cl. 260—243 C **10 Claims**

1. A compound selected from the group consisting of a highly active cephalosporin antibiotic highly stable to β-lactamases, having the formula



wherein R^a is thienyl, furyl or pyridyl or any of these groups substituted by chloro, bromo, iodo, fluoro, hydroxy, lower alkyl, nitro, amino, loweralkylamino, diloweralkylamino, lower alkanoyl, lower alkanoylamino, lower alkoxy, lower alkylthio or carbamoyl; R^b is phenyl; naphthyl; benzyl; phenylethyl; diphenylmethyl; triphenylmethyl; thienylmethyl; furylmethyl; pyridylmethyl; pyrrolylmethyl or any of these groups substituted by hydroxy, lower alkoxy, phenoxy, benzyloxy, carboxy, lower alkoxycarbonyl, benzyloxycarbonyl, mercapto, lower alkylthio, phenylthio, benzylthio, acetamido, benzamido, cyano, formyl, lower alkanoyl, benzoyl, amino, methylamino, ethylamino, dimethylamino, lower alkoxycarbonylamino, benzyloxycarbonylamino, phthalimido, acetoxy, propionyloxy, pivaloyloxy, chloro, bromo, iodo, fluoro, nitro or azido; and Y is a group of formula —O.CO.R^g where R^g is an alkyl or alkenyl group containing up to 4 carbon atoms or phenyl, said cephalosporin antibiotic being in the form of a syn isomer free of the corresponding anti isomer to the extent of at least 75% based on the total weight of said antibiotic; and a physiologically acceptable salt thereof.

4,024,134
SYN ISOMERS OF CEPHALOSPORINS HAVING α-HYDROXIMINO- OR α-ACYLOXYIMINOACYLAMIDO GROUPS AT POSITION-7

Michael Gregson, London; Martin Christopher Cook, and Gordon Ian Gregory, both of Chalfont St. Peter, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

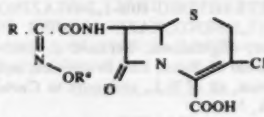
Continuation of Ser. No. 274,602, July 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 221,057, Jan. 26, 1970, abandoned. This application Feb. 28, 1975, Ser. No. 554,014

Claims priority, application United Kingdom, Jan. 29, 1971, 3531/71; Oct. 1, 1971, 45885/71; July 7, 1972, 32004/71

Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **2 Claims**

1. A compound selected from the group consisting of a cephalosporin antibiotic of the formula

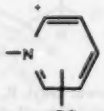


wherein R is thienyl; furyl or pyridyl;

R^a is H or

wherein R^c is C_1-C_4 alkyl, C_1-C_4 chloroalkyl, C_1-C_4 alkoxy, phenyl, nitrophenyl, C_1-C_4 alkylamino or C_1-C_4 chloroalkylamino; and,

Y is



(i)

in which *n* is zero or an integer from 1 to 5 and R^d, which when *n* is from 2–5 may be the same or different, is lower alkyl; phenyl; phenyl lower alkyl; C_1-C_3 alkoxymethyl; acetoxymethyl; formyl; carbamoyl; acetoxy; C_1-C_3 alkoxy; phenoxy, benzyloxy; C_1-C_2 alkylthio; cyano; hydroxy; N-monoloweralkylcarbamoyl; N,N-diloweralkylcarbamoyl; N-(hydroxyloweralkyl) carbamoyl; or carbamoylloweralkyl or;

ii. azido; and a physiologically acceptable salt thereof, said cephalosporin antibiotic being in the form of a syn isomer free of the corresponding anti isomer to the extent of at least 75% based on the total weight of said antibiotic.

4,024,135
(CARBAMOYL)PYRIDINO DERIVATIVES OF UREIDOCEPHALOSPORINS

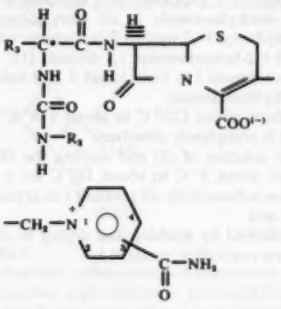
Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 5, 1976, Ser. No. 664,335

Int. Cl.² C07D *501/44*

U.S. Cl. 260—243 C **22 Claims**

1. A compound of the formula



wherein R_2 is hydrogen or lower alkyl; R_3 is phenyl, phenyl-lower alkyl, substituted phenyl or phenyl-lower alkyl wherein said phenyl substituent is one or two members selected from the group consisting of halogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, and hydroxy, or a substituted or unsubstituted heterocyclic selected from the group consisting of 2-thienyl, 3-thienyl, 2-furyl, and 3-furyl, where said heterocyclic substituent is attached to an available carbon atom and is halogen or lower alkyl of 1 to 4 carbons; and the

substituent is in 2-, or 3- or 4-position.

4,024,136
PROCESS FOR THE PREPARATION OF 4-HYDROXY-3-(5-METHYL-3-ISOXAZOLYLCARBAMOYL)-2-METHYL-2H-1,2-BENZOTHIAZINE 1,1-DIOXIDE

Jerome Daniel Genzer, Livingston, and Francisco Carrio Fontsere, Andover, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 588,752, June 20, 1975, Pat. No. 3,960,856. This application Mar. 10, 1976, Ser. No. 665,485

The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.

Int. Cl.² C07D *279/02*

U.S. Cl. 260—243 R **8 Claims**

1. An improved process for preparing 4-hydroxy-3-(5-methyl-3-isoxazolylcarbamoyl)-2-methyl-2H-1,2-benzothiazine 1,1-dioxide (I) which comprises the following steps:

A. suspending more than two but less than six moles of an alkali metal alkoxide of a lower alcohol in dimethylformamide;

B. dissolving one mole of alkyl 2,3-dihydro-3-oxo-1,2-benzisothiazole-2-acetate 1,1-dioxide (II) in dimethylformamide;

C. combining the suspension of (A) and the solution of (B) rapidly, with stirring, while maintaining the internal reaction temperature at from about 15° to about 30° C.;

D. continuing the stirring of the reaction mixture of (C) and then acidifying, with the total time from initial reactant combination to acidification being from about 20 minutes to about 60 minutes;

E. precipitating from (D) substantially pure alkyl 4-hydroxy-2H-1,2-benzothiazine-3-carboxylate 1,1-dioxide (III) in high yield without recrystallization;

F. methylating the precipitrate of (E) on the sulfonamide nitrogen;

G. refluxing the alkyl 4-hydroxy-2-methyl-2H-1,2-benzothiazine-3-carboxylate 1,1-dioxide (IV) obtained in (F) with 3-amino-5-methylisoxazole in an inert solvent to obtain crude 4-hydroxy-3-(5-methyl-3-isoxazolylcarbamoyl-2-methyl-2H-1,2-benzothiazine 1,1-dioxide (I);

H. adding crude compound I to from about 4 to 8 volumes of heated dimethylformamide;

I. heating (H) to from about 125° C to about 148° C until crude product I is completely dissolved;

J. filtering the hot solution of (I) and cooling the filtrate obtained to from about 5° C to about 10° C for a time sufficient to allow substantially all product I to crystallize out of solution; and

K. filtering (J), followed by washing and drying to obtain substantially pure crystalline product I.

4,024,137
7β-[2-ETHERIFIED OXIMINO-2-(PHENYL- OR NAPHTHYLACETAMIDO)] CEPHALOSPORINS

Martin Christopher Cook; Gordon Ian Gregory, both of Chalfont St. Peter, and Janice Bradshaw, Harrow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

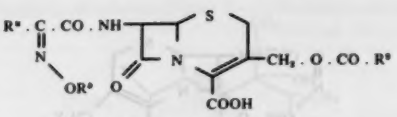
Division of Ser. No. 304,524, Nov. 7, 1972, Pat. No. 3,971,778, which is a continuation-in-part of Ser. No. 252,666, May 12, 1972, abandoned. This application June 16, 1975, Ser. No. 587,065

Claims priority, application United Kingdom, May 14, 1971, 15082/71; Oct. 1, 1971, 45884/71; Oct. 25, 1972, 49255/72

Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **15 Claims**

1. A compound selected from the group consisting of a highly active cephalosporin antibiotic highly stable to β-lactamases, having the formula



wherein R^a is phenyl or naphthyl or each of these groups substituted by chloro, bromo, iodo, fluoro, hydroxy, lower alkyl, nitro, amino, loweralkylamino, diloweralkylamino, lower alkanoyl, lower alkanoylamino, lower alkoxy, lower alkylthio or carbamoyl; R^b is lower alkyl or cycloalkyl containing 3–7 carbon atoms; and, R^a is an alkyl or alkenyl group containing up to 4 carbon atoms, cyclopropyl, cyclopentyl, cyclohexyl, or phenyl, said cephalosporin antibiotic being in the form of a syn isomer free of the corresponding anti isomer to the extent of at least 75% based on the total weight of said antibiotic; and a physiologically acceptable salt thereof.

4,024,138
ALPHA-(HALOPHENOXY)ACETYL NITROMETHYLENE TETRAHYDROTHIAZINES

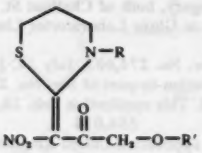
Steven A. Roman, Oakdale, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 26, 1976, Ser. No. 680,615

Int. Cl.² C07D *279/06*

U.S. Cl. 260—243 R **1 Claim**

1. A compound of the formula:



wherein R is hydrogen or middle halogen and R is 2,4-dichlorophenyl, 2-methyl-4-chlorophenyl or 2,4,5-trichlorophenyl.

4,024,139
2,3,4,4A-TETRAHYDRO-10H-1,2-OXAZINO[3,2-B](1,3)BENZOXAZIN-10-ONES

David B. Reisner, Hightstown; Bernard J. Ludwig, North Brunswick; Harold M. Bates, East Brunswick, and Frank M. Berger, Princeton, all of N.J., assignors to Carter-Wallace, Inc., New York, N.Y.

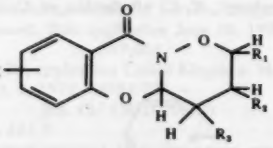
Continuation-in-part of Ser. No. 809,930, March 24, 1969, Pat. No. 3,684,805. This application May 8, 1972, Ser. No. 250,909

The portion of the term of this patent subsequent to Aug. 15, 1989, has been disclaimed.

Int. Cl.² C07D *498/02*

U.S. Cl. 260—244 R **2 Claims**

1. A compound of the formula:



wherein X is hydrogen or lower alkyl, R_1 and R_2 are hydrogen and R_3 is hydrogen or lower alkyl.

4,024,140
PRODUCTION OF ALKALI METAL SALTS OF DICHLOROISOCYANURIC ACID

John A. Wojtowicz, Cheshire, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed May 19, 1976, Ser. No. 687,586
Int. Cl.² C07D 251/36
U.S. Cl. 260—248 C 9 Claims

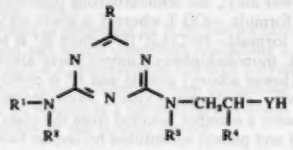
1. A process for the production of an alkali metal salt of dichloroisocyanuric acid which comprises reacting a monoalkali metal cyanurate with hypochlorous acid to form a reaction mixture while maintaining the pH of said reaction mixture at from about 6.0 to about 7.5, and recovering said alkali metal salt of dichloroisocyanuric acid.

4,024,141
S-TRIAZINES

John W. Kobzina, Walnut Creek, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 462,905, April 22, 1974, Pat. No. 3,938,958, which is a continuation-in-part of Ser. No. 288,245, Sept. 11, 1972, Pat. No. 3,819,626. This application Dec. 29, 1975, Ser. No. 644,800
Int. Cl.² C07D 251/50, 251/52
U.S. Cl. 260—249.8 7 Claims

1. A compound of the formula



wherein R is chlorine, methoxy or methylthio; R^1 is alkyl of from 1 to 6carbon atoms, alkenyl of 3 to 6 carbon atoms, or alkoxylalkyl of 2 to 6 carbon atoms; R^2, R^3 and R^4 individually are hydrogen or alkyl of 1 to 6 carbon atoms; and Y is oxygen or sulfur.

4,024,142
QUINOXALINE DERIVATIVES AS IMMUNE REGULANTS

Jack B. Campbell, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed July 16, 1975, Ser. No. 596,543
Int. Cl.² C07D 241/42
U.S. Cl. 260—250 Q 1 Claim

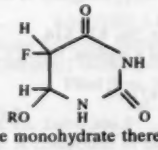
1. The compound which is 9-(trifluoromethyl)acenaphtho[1,2-b]quinoxaline.

4,024,143
SILYLATION OF 5-FLUORO-6-HYDROXY OR ALKOXY PYRIMIDINE

Paul D. Schuman, Hawthorne, and Roy Anderson, Gainesville, both of Fla., assignors to PCR, Inc., Gainesville, Fla.

Filed Mar. 11, 1976, Ser. No. 665,866
Int. Cl.² C07D 239/52
U.S. Cl. 260—251 R 13 Claims

1. A process for producing bis-silyl derivatives of fluorinated pyrimidines, said process comprising reacting a 5-fluoropyrimidine of the formula



or the monohydrate thereof, wherein R is hydrogen or lower alkyl, including lower fluoroalkyl, with at least a stoichiometric amount of silylating agent which is

a. silane of the formula

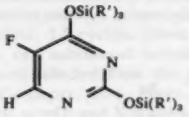
$(R')_3SiX$

wherein each R′ is lower alkyl and X is halogen, and/or b. disilazane of the formula

$[(R')_3Si]_2NH$

wherein R′ is lower alkyl,

at a temperature of about room temperature to the boiling point of the reaction mixture, to produce a product of the formula



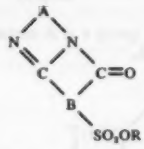
wherein R′ is defined above.

4,024,144
POLYCYCLIC DYESTUFFS

Manfred Groll; Volker Hederich, both of Cologne, and Hans-Samuel Bien, Burscheid, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 19, 1975, Ser. No. 578,770
Claims priority, application Germany, May 21, 1974, 2424542
Int. Cl.² C09B 57/00; C07D 487/04, 487/06
U.S. Cl. 260—251 A 10 Claims

1. Polycyclic dyestuff, free from sulphonic acid groups, of the formula



in which

A denotes o-phenylene, o-naphthylene or peri-naphthylene;

B denotes o-phenylene or peri-naphthylene;

A and B are unsubstituted or substituted by chlorine, bromine, C_1–C_4-alkyl, C_1–C_4-alkoxy, nitro or phenyl;

R denotes phenyl; naphthyl; phenyl or naphthyl substituted by C_1–C_8-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylmercapto, halogeno, nitro, cyano, C_1–C_4-alkylcarbonylamino, C_1–C_4-alkoxycarbonyl, C_1–C_4-alkylcarbonyl, phenyl or phenoxy.

4,024,145
BENZYLPYRIMIDINE DERIVATIVES

Ivan Kompis, Oberwil, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Nov. 6, 1974, Ser. No. 521,384
Claims priority, application Switzerland, Oct. 24, 1974, 15680/74
Int. Cl.² C07D 239/48
U.S. Cl. 260—256.4 N 2 Claims

1. 2,4-Diamino-5-(4-bromo-3,5-dimethoxybenzyl)-pyrimidine.

4,024,146
DIACRYLIC ACID ESTER DERIVATIVES OF URACIL COMPOUNDS

Juergen Habermeier, Pfeffingen, and Daniel Porret, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

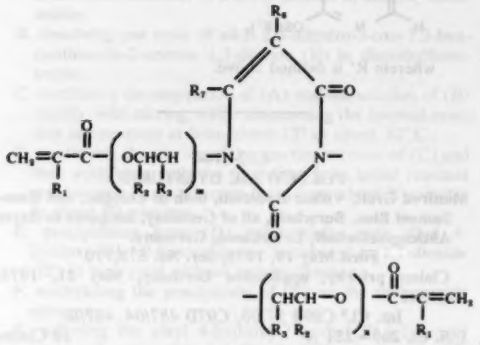
Division of Ser. No. 471,407, May 20, 1974, Pat. No. 3,932,176, which is a division of Ser. No. 241,386, April 5, 1972, Pat. No. 3,852,302. This application Aug. 4, 1975, Ser. No. 601,961

Claims priority, application Switzerland, Apr. 16, 1971, 5557/71

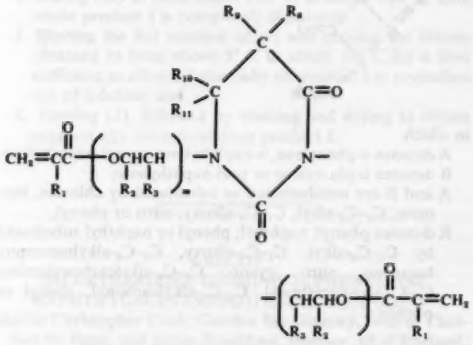
Int. Cl.² C07D *239/10*

U.S. Cl. 260—260 3 Claims

1. A diacrylic acid ester of the formula



or



wherein

R_1 and R_3 are independently hydrogen or methyl,

R_2 is hydrogen, lower alkyl, lower alkyl interrupted by oxygen, or phenyl, or R_2 and R_3 together represent trimethylene or tetramethylene,

R_6 and R_7 are independently hydrogen or alkyl of 1 to 4 carbon atoms,

R_8, R_9, R_{10} and R_{11} are independently hydrogen or alkyl of 1 to 4 carbon atoms, and

m and *n* are each a whole number having a value of 1 to 30.

4,024,147
HETEROCYCLIC COMPOUNDS

John Leheup Archibald, Windsor, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

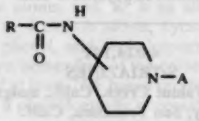
Continuation-in-part of Ser. No. 373,046, June 25, 1973, abandoned. This application Apr. 18, 1975, Ser. No. 569,242

Claims priority, application United Kingdom, June 30, 1972, 30636/72

Int. Cl.² C07D *211/58*

U.S. Cl. 260—293.69 12 Claims

1. A compound selected from those of the formula



[I]

and their pharmaceutically acceptable acid addition salts, wherein A represents a member selected from the class consisting of

i. alkyl containing 2 to 3 carbon atoms monosubstituted by a substituent selected from hydroxyl, di(lower alkyl-)amino, cyano, halogen, groups of the formula —CO.NX.Y where X and Y are selected from hydrogen and lower alkyl, the semicarbazone derivatives of groups of the formula —CO.T where T is lower alkyl and groups of the formula—$N(CH_2R^1)R^2$ where R^1 is selected from phenyl, monohalophenyl, mono(lower alkyl)phenyl and mono(lower alkoxy) phenyl and R^2 is pyridyl; and

ii. di(lower alkyl)amino(lower alkoxy)carbonyl; and R represents a member selected from the class consisting of phenyl and phenyl substituted by one or two substituents selected from lower alkyl, halogen and nitro.

4,024,148
CRYSTALLINE FORM OF QUINACRIDONE

Ronald S. Tyson, Piscataway, and Leonard Shapiro, East Brunswick, both of N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 583,769, June 4, 1975, abandoned. This application Feb. 2, 1976, Ser. No. 654,271

Int. Cl.² C09B *48/00*

U.S. Cl. 260—279 QA 1 Claim

1. A red crystalline linear quinacridone pigment characterized by an X-ray diffraction pattern exhibiting four strong lines corresponding to interplanar spacings of 14.3A, 6.4A, 3.46A, and 3.21A; a moderate line corresponding to interplanar spacing of 7.1A; three weak lines corresponding to interplanar spacings of 5.4A, 4.2A, and 2.35A; and two very weak lines corresponding to interplanar spacings of 5.0A and 4.4A.

4,024,149
2-PHENYL-PYRAZOLO-[1,5-A]QUINOLINE COMPOUNDS

Giorgio Winters; Gianfranco Odasso; Giulio Galliani, and Leonard J. Lerner, all of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

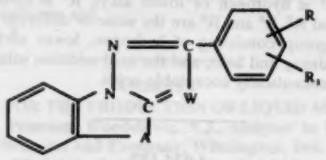
Filed Oct. 22, 1975, Ser. No. 624,614

Claims priority, application United Kingdom, Nov. 23, 1974, 50853/74

Int. Cl.² C07D *471/04*

U.S. Cl. 260—288 CF 5 Claims

1. A compound represented by the formula



wherein;

R and R_1 are independently selected from hydrogen, hydroxy, (C_{1-4}) alkyl, (C_{1-4})alkoxy, (C_{3-5})alkenyloxy, (C_{3-5})alkynyloxy, (C_{3-6})cycloalkyloxy, benzyloxy, fluoro, chloro and bromo or taken together represent a methylenedioxy group;

W represents the group =CH— and A is selected from $-CH_2-CH_2-$ and —CH=CH—.

4,024,150

METHOD OF PREPARING AN N,N'-BIS(P-CYANOPHENYL)-4,4'-BIPYRIDYLIUM SALT

John Graham Allen, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 257,082, May 26, 1972, abandoned. This application Oct. 4, 1974, Ser. No. 512,305

Int. Cl.² C07D *213/22*

U.S. Cl. 260—294.9 5 Claims

1. A method of preparing an N,N'-bis(p-cyanophenyl)-4,4'-bipyridylium salt which comprises contacting a N,N'-bis(2,4-dinitrophenyl)-4,4'-bipyridilium salt with p-cyanoaniline in an inert aqueous polar solvent medium containing at least about 50% water by volume at a temperature of about 160° C or less at which reflux of the solvent occurs.

4,024,151

4-PHENYLPIPERIDINYL (AND 4-PHENYL-TETRAHYDROPYRIDINYL) ALKYLAMINO-OXOALKANOIC ACIDS

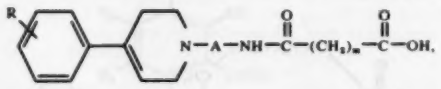
Peter C. Wade, Pennington, N.J., and B. Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sept. 29, 1975, Ser. No. 617,335

Int. Cl.² C07D *211/70, 211/16*

U.S. Cl. 260—295 AM 4 Claims

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein A is a straight or branched chain alkylene group having 2 to 8 carbon atoms, R is hydrogen, halogen, alkyl, alkoxy, alkylthio, trifluoromethyl, nitro, amino, or cyano; and *m* is 2, 3, or 4; wherein the terms alkyl, alkoxy and alkylthio refer to groups having 1 to 4 carbon atoms.

4,024,152

4-DITHIO-3-IMIDO-AZETIDIN-2-ONES

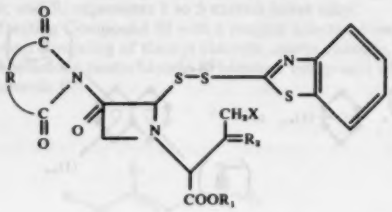
Stjepan Kukolja, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Sept. 19, 1975, Ser. No. 615,154

Int. Cl.² C07D *417/00*

U.S. Cl. 260—306.5 13 Claims

1. A compound of the formula



in which R_1 is selected from the group consisting of C_1–C_4 alkyl, 2-iodoethyl, benzyl, p-nitrobenzyl, succinimidomethyl, phthalimidomethyl, p-methoxybenzyl, benzhydryl, C_2–C_6 alkanoyloxymethyl, trimethylsilyl, and phenacyl; R is C_2–C_4 alkylene, 1,2-cyclohexylene, 1,2-phnylene, 1,2-cyclohexenylene, or a substituted derivative of any of these having a substituent selected from the group consisting of C_1–C_3 alkyl, C_1–C_3 alkoxy, nitro, fluoro, chloro, bromo, and iodo; R_2 is $=CH_2$ or =O; and X is chloro or bromo.

4,024,153

POLYCHROMOPHORIC BENZOTRIAZOLE ULTRAVIOLET STABILIZERS

Richard Hsu-Shien Wang, and Gether Irick, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 511,567, Oct. 2, 1974, Pat. No. 3,954,706. This application Dec. 10, 1975, Ser. No. 639,934

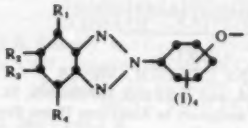
Int. Cl.² C07D *249/20*

U.S. Cl. 260—308 B 20 Claims

1. Compound having the formula:

$(A)_a$—Z

wherein A is a group having the structure



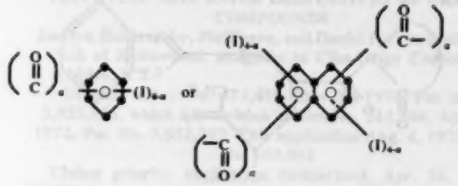
wherein the oxy group is in the meta or para position to the benzotriazole group;

R_1, R_2, R_3 and R_4 are hydrogen, chloro, bromo, fluoro, alkyl having 1 to 12 carbon atoms, cycloalkyl, phenyl, benzyl, alkoxy having 1 to 12 carbon atoms, cyano, and carboalkoxy having 2 to about 12 carbon atoms;

I is the same as R_1, R_2, R_3 and R_4 and is present on all positions of the benzenoid ring, except the carbon atoms attached to the heterocyclic ring and the carbon atom attached to the carbonyl group connecting the heterocyclic aromatic A group with the aromatic Z group, at least one I substituent on one of the carbon atoms adjacent to said carbon atom attached to said carbonyl group is hydrogen and said remaining I substituents can all be the same or different;

a is an integer of 1 to 4; and

Z is an aromatic group having the formula:



where I is the same substituent as listed above and is present in all positions of the benzenoid ring except the carbon atoms attached to the carbonyl group connecting the A and Z moieties, and said I substituents can all be one of the substituents listed above or different listed substituents.

4,024,154

MANUFACTURE OF COPPER PHTHALOCYANINE PIGMENT VIA AQUEOUS MILLING

Julius Jackson, Westfield, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 7, 1976, Ser. No. 674,669
Int. Cl.[2] C09B *47/04*
U.S. Cl. 260—314.5 7 Claims

1. In a process for converting crude copper phthalocyanine to pigmentary form which comprises dry milling said copper phthalocyanine in a milling apparatus having an attrition and shearing action, contacting the dry-milled copper phthalocyanine with an organic liquid in water emulsion, and recovering the pigmentary copper phthalocyanine,

the improvement comprising utilizing as said organic liquid at least one aliphatic hydrocarbon derived from petroleum boiling from 50° to 180° C.

4,024,155

2-(3′-METHOXY-4′-HYDROXY-PHENOL)-INDOLE

Charles Pigerol, Saint-Ouen; Marie-Madeleine Chandavoine; Paul de Cointet de Fillain, both of Sisteron, and Souli Nanthavong, Grenoble, all of France, assignors to Labaz, Paris, France

Filed May 30, 1975, Ser. No. 582,092
Claims priority, application France, June 5, 1974, 74.19304
Int. Cl.[2] C07D *209/12*
U.S. Cl. 260—326.16 1 Claim

1. 2-(3′-Methoxy-4′-hydroxy-phenyl)-indole.

4,024,156

THIOPHENE ETHANOLAMINES

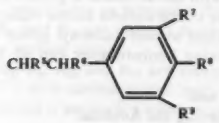
Jehan F. Bagli, Kirkland, and Eckhardt Ferdinandi, St. Laurent, both of Canada, assignors to American Home Products Corporation, New York, N.Y.

Filed Apr. 18, 1975, Ser. No. 569,509
Claims priority, application Canada, Apr. 18, 1974, 197896
Int. Cl.[2] C07D *333/08*, *333/10*
U.S. Cl. 260—332.3 R 26 Claims

1. A compound of the formula

$$ArCHOR^1CHR^2NR^3R^4$$

in which Ar is selected from the group consisting of 2-thienyl, 5-(lower alkyl)-2-thienyl, 5-phenyl-2-thienyl and 4,5-dichloro-2-thienyl; R^1 is hydrogen or lower alkyl; R^2 is hydrogen or lower alkyl; R^3 is hydrogen or lower alkyl; and R^4 is a substituted phenethyl of the formula



wherein R^5 is hydrogen or lower alkyl, R^6 is hydrogen or hydroxy and R^7, R^8 and R^9 are the same or different selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, hydroxy and halo; and the acid addition salts thereof with pharmaceutically acceptable acids.

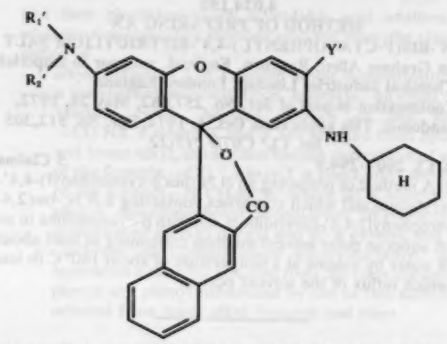
4,024,157

FLUORAN COMPOUNDS AND RECORDING SHEET CONTAINING THEM

Seiji Hotta, Ibaragi, and Yukiaki Ito, Minoo, both of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

Filed Oct. 1, 1974, Ser. No. 510,916
Claims priority, application Japan, Oct. 5, 1973, 48-112591
Int. Cl.[2] C07D *493/10*
U.S. Cl. 260—335 3 Claims

1. A compound of the formula,



wherein R_1' is methyl, ethyl or cyclohexyl, R_2' is methyl or ethyl and Y′ is hydrogen or a lower alkyl.

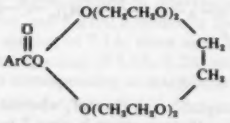
4,024,158

AROYLCROWNETHERS

James Charles Kauer, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

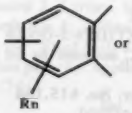
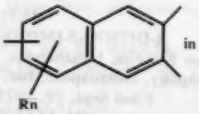
Filed Sept. 19, 1975, Ser. No. 615,184
Int. Cl.[2] C07D *319/08*
U.S. Cl. 260—340.3 16 Claims

1. A compound of the formula



wherein

Ar is phenyl or naphthyl, each with up to two substituents of alkyl of 1–10 carbons, alkoxy of 1–10 carbons, halogen, carboxy or cyano groups;

Q is  or  in which

in which

R is fluorine, chlorine, bromine, nitro, amino, or alkyl of 1–10 carbons; and
n is 0 to 2.

4,024,159

PROCESS FOR THE PRODUCTION OF LIQUID ACETALS

Marvin L. Peterson, Woodstown, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 7, 1974, Ser. No. 495,510
Int. Cl.² C07D *319/06*
U.S. Cl. 260—340.7 7 Claims

1. In a process for preparing acetals by reacting diols with aldehydes the improvement which comprises reacting an alpha, beta diol; mixtures thereof; an alpha, gamma diol or mixtures thereof wherein said diol has 4 to 20 carbon atoms at a temperature ranging from 0°–100° C in the presence of an acid catalyst with from a stoichiometrically equivalent quantity to a 50% excess of an aldehyde having 1 to 4 carbon atoms to yield a liquid acetal having a solubility of less than 10% by weight in water at 25° C.

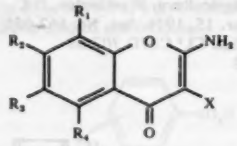
4,024,160

SUBSTITUTED 2-AMINO CHROMONES AND PROCESS FOR THE PREPARATION THEREOF

Richard E. Brown, Hanover, and David M. Lustgarten, Dover, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 532,417, Dec. 13, 1974, Pat. No. 3,932,466. This application Oct. 3, 1975, Ser. No. 619,150
Int. Cl.² C07D *311/02*, *311/72*
U.S. Cl. 260—345.2 5 Claims

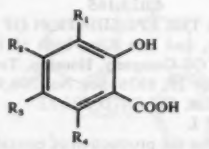
1. A process for the production of a compound of the Formula I:



I

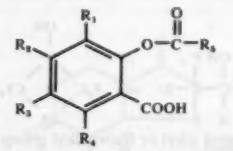
wherein R_1, R_2, R_3 and R_4 each represent hydrogen, hydroxy, lower alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms, halogen or phenyl; and X represents carboxamido, which comprises:

A. Treating a compound of the Formula II:



II

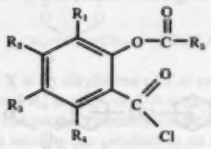
wherein R_1, R_2, R_3, and R_4 are as defined above in Formula I with an acid chloride or an acid anhydride to convert all free hydroxyl groups to acyloxy groups and obtain a compound of the Formula III:



III

wherein R_1, R_2, R_3, and R_4 each represent hydrogen, lower alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms, lower alkanoyloxy of 2 to 6 carbon atoms, halogen, or phenyl; and R_5 represents 1 to 5 carbon lower alkyl;

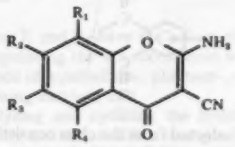
B. Treating Compound III with a reagent selected from the group consisting of thionyl chloride, oxalyl chloride, and phophorous pentachloride to obtain a compound of the Formula IV:



IV

wherein R_1, R_2, R_3, R_4, and R_5 are as defined above in formula III;

C. Treating a solution of Compound IV with malononitrile in the presence of a basic catalyst selected from the group consisting of triethylamine, alkali metal hydrides, alkali metal hydroxides, amides of the formula $M—NH_2$ wherein M is an alkali metal, and alkoxides of the formula R—O—M wherein R is a 1 to 6 carbon lower alkyl group and M is an alkali metal, to obtain a compound of the formula:



wherein R_1, R_2, R_3, and R_4 are as defined above in Formula I, which is subjected to acid catalysed hydrolysis to obtain Compound I wherein X is carboxamido.

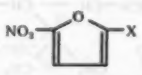
4,024,161

2-(2-HALO-1-(UNSATURATED ALIPHATIC))-5-NITROFURANS

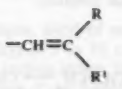
Samuel B. Soloway, and George Bernson Payne, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed May 28, 1974, Ser. No. 473,653
Int. Cl.² C07D *307/70*
U.S. Cl. 260—346.1 R 6 Claims

1. A compound of the formula



wherein X is



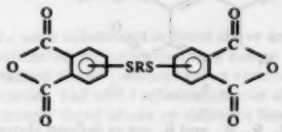
or —C C—R, R is middle halogen and R^1 is methyl or middle halogen.

4,024,162
AROMATIC DITHIO DIANHYDRIDES

Frank J. Williams, III, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 500,136, Aug. 23, 1974, Pat. No. 3,933,862. This application Oct. 28, 1975, Ser. No. 625,828
Int. Cl.² C07D *307/89, 407/12*
U.S. Cl. 260—346.3 **5 Claims**

1. A method for making dithio dianhydrides of the formula,

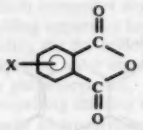


which comprises,

effecting reaction in the presence of a dipolar aprotic solvent and a base, selected from the class consisting of alkali metal carbonates and organic amines, between an aromatic dithiol of the formula,

HSRSH

and a substituted anhydride of the formula



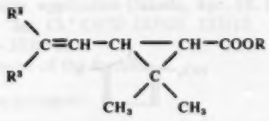
where X is a radical selected from the class consisting of nitro, chloro, fluoro and bromo and R is a divalent aromatic radical having from 6–3 carbon atoms.

4,024,163
INSECTICIDES

Michael Elliott, Harpenden; Norman Frank Janes, Luton, and David Allen Pulman, Harpenden, all of England, assignors to National Research Development Corporation, London, England

Continuation-in-part of Ser. No. 363,318, May 24, 1973, abandoned. This application Aug. 13, 1974, Ser. No. 497,056
Claims priority, application United Kingdom, May 25, 1972, 24809/72; May 25, 1972, 24810/72; June 30, 1972, 30838/72; Dec. 21, 1972, 59184/72; Apr. 30, 1973, 20539/73
Int. Cl.² C07C *69/74, 121/75, 307/54, 204/18*
U.S. Cl. 260—347.4 **34 Claims**

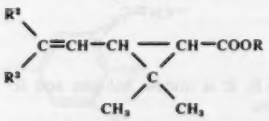
1. A compound of the formula:



wherein:

R^2 and R^3 independently represent halogen, and R is 5-benzyl-3-furylmethyl.

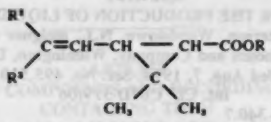
8. A compound of the formula:



wherein:

R^2 and R^3 independently represent halogen, and R is 3-phenoxybenzyl.

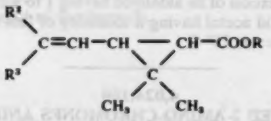
18. A compound of the formula:



wherein:

R^2 and R^3 independently represent halogen, and R is α-cyano-3-phenoxybenzyl.

30. A compound of the formula:



wherein:

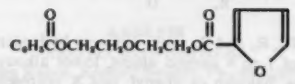
R^2 and R^3 independently represent halogen, and R is α-cyano-5-benzyl-3-furylmethyl.

4,024,164
2-(2-BENZOXYETHOXY)-ETHYL-2-FUROATE

August V. Bailey; Gordon J. Boudreaux; Gene Sumrell, all of New Orleans, and Arthur F. Novak, Baton Rouge, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Mar. 15, 1976, Ser. No. 667,055
Int. Cl.² C07D *307/68*
U.S. Cl. 260—347.5 **1 Claim**

1.

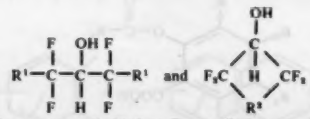


4,024,165
PROCESS FOR THE EPOXIDATION OF OLEFINS

Thomas M. Shryne, and Leo Kim, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed June 29, 1976, Ser. No. 700,994
Int. Cl.² C07D *301/12*
U.S. Cl. 260—348.5 L **10 Claims**

1. In the process for the production of epoxides by contacting an olefin with hydrogen peroxide in an organic solvent in the presence of a transition metal compound and a nitrogen-containing compound the improvement which comprises using as the organic solvent a fluorinated alcohol having the formula:



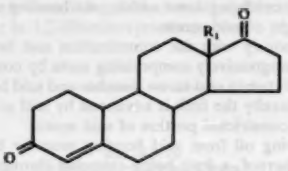
where R^1 is a saturated alkyl or fluoroalkyl group having 6 or less carbons, a phenyl group, or a flourine atom and R^2 is a saturated alkyl or fluoroalkyl of 2 and 3 carbon atoms which forms part of a 5 or 6 membered ring.

4,024,166
PROCESS FOR THE PREPARATION OF 13β-ALKYL-4-GONENE-3,17-DIONES

Gerhard Sauer; Ulrich Eder; Gregor Haffer; Günter Neef, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

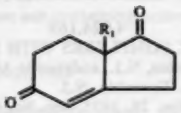
Filed Oct. 10, 1975, Ser. No. 621,384
Claims priority, application Germany, Oct. 11, 1974, 2449031
Int. Cl.² C07J 1/00
U.S. Cl. 260—397.3 8 Claims

1. A process for the preparation of 13β-alkyl-4-gonene-3,17-diones of the formula

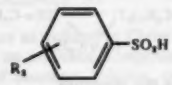


wherein R_1 is methyl or ethyl, which comprises:

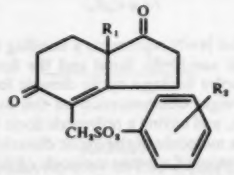
a. reacting a 7aβ-alkyl-5,6,7,7a-tetrahydroindane-1,5-dione of the formula



wherein R_1 is methyl or ethyl, with formaldehyde and an arylsulfinic acid of the formula

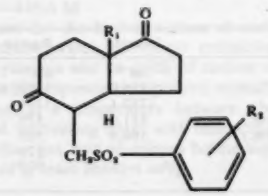


wherein R_2 is hydrogen or alkyl of 1–4 carbon atoms, or with an adduct of formaldehyde and the arylsulfinic acid, to produce a tetrahydroindane derivative of the formula



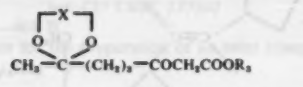
wherein R_1 and R_2 have the values given above;

b. hydrogenating the tetrahydroindane derivative with hydrogen in the presence of a palladium-, platinum-, or rhodium-containing hydrogenation catalyst to produce a perhydroindane derivative of the formula



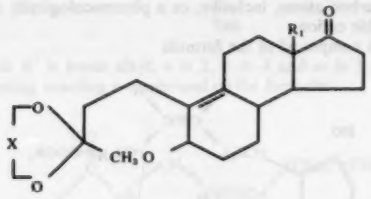
wherein R_1 and R_2 have the values given above;

c. condensing the perhydroindane derivative in the presence of a proton-accepting agent containing an alkali metal or alkaline earth metal with a 7,7-alkylenedioxy-3-oxooctanoate ester of the formula



wherein X is an alkylidene of 2–6 carbon atoms or o-phenylene and R_3 is alkyl of 1–6 carbon atoms;

d. treating the product obtained with a strong aqueous base, and then heating the product in an inert solvent at about 60° to about 150° C. to produce a 4,5-secosteroid of the formula



wherein X and R_1 have the values given above;

e. hydrogenating the 4,5-secosteroid with hydrogen in the presence of a palladium-, platinum-, rhodium-, or nickel-containing catalyst; and

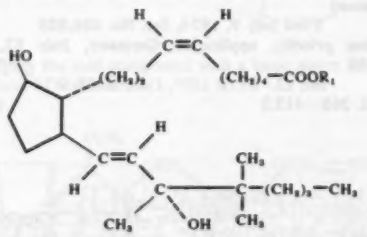
f. hydrolyzing and cyclizing the hydrogenated 4,5-secosteroid by treatment with a strong acid.

4,024,167
11-DIOXY-CIS-4,5-DIDEHYDRO-PGF COMPOUNDS

Gordon L. Bundy, Kalamazoo, and Norman A. Nelson, Galesburg, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 548,586, Feb. 10, 1975, Pat. No. 3,987,072. This application Jan. 12, 1976, Ser. No. 648,266
Int. Cl.² C07C 177/00
U.S. Cl. 260—410 4 Claims

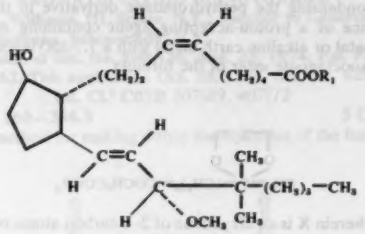
1. A compound of the formula



or a mixture comprising that compound and the enantiomer thereof;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation.

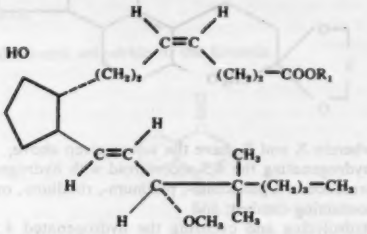
2. A compound of the formula



or a mixture comprising that compound and the enantiomer thereof;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation.

3. A compound of the formula



or a mixture comprising that compound and the enantiomer thereof;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,024,168
METHOD OF EXTRACTING OILS FROM FRUITS SUCH AS SEEDS NUTS AND BEANS

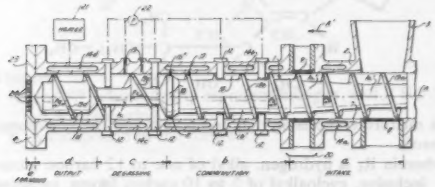
Thorsten Homann, Hamburg; Felix Horst Schneider, Essen, and Dietmar Weber, Hamburg, all of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed July 9, 1974, Ser. No. 486,825

Claims priority, application Germany, July 12, 1973, 2335385

Int. Cl.[2] C11B *1/00*, *1/08*; B30B *9/14*

U.S. Cl. 260—412.2 **1 Claim**



1. A method of extracting oil from fruit comprising seeds, nuts or beans in a screw extruder in which a screw member is rotatable relatively to an elongated housing member and the screw member is provided with at least one screw flight extending helically therealong, said method comprising the steps of:

introducing the fruit into said extruder at an inlet, end thereof and displacing the fruit through said extruder by rotating said screw member whereby said flight forces the fruit toward an outlet end of said housing member;

comminuting the fruit in said extruder between said screw member and said housing member;

simultaneously with the comminution of said fruit between said members, heating said fruit by applying heat to at least one of said members whereby the applied heat is transferred to said fruit;

simultaneously with the heating of said fruit and the comminution thereof preventing air from contacting the fruit and by confining same within said housing member with the flight of said screw;

simultaneously with the comminution and heating of the fruit, progressively compressing same by constricting the space between said screw member and said housing member whereby the fruit is advanced by said screw member past a constricted portion of said space;

withdrawing oil from said housing member between said ends thereof, a fruit being extruded through said outlet end of said housing member, said screw member being of decreased diameter adjacent said outlet end to form a degassing zone; and

evacuating vapor from said degassing zone.

4,024,169
TITANIUM COMPLEXES WITH NITROGEN

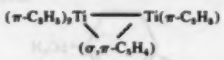
Guido P. Pez, Boonton, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 28, 1975, Ser. No. 636,197

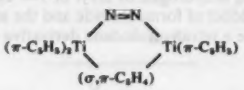
Int. Cl.[2] C07F *7/28*

U.S. Cl. 260—429.5 **3 Claims**

1. Complex of the titanium cyclopentadienyl compound



and nitrogen, having the structure:



where the symbol N=N represents a bonding state intermediate between the azo-N=N- bond and the hydrazine =N-N= bond; such complex having a cyclic dimeric form as indicated by molecular weight determination on this form dissolved in tetrahydrofuran, and having a polymeric form wherein a nitrogen atom of one molecule of the cyclic dimeric form is coordinated with a Ti atom of another molecule of the cyclic dimeric form as indicated by low solubility of this polymeric form in 1,2-dimethoxyethane and breakdown of this form to the cyclic dimeric form by action of tetrahydrofuran; said cyclic dimeric form of said complex showing molecular weight in tetrahydrofuran in good agreement with the theoretical value of 383 for such dimeric form, and having the following characteristic vibrational frequency assignments for the N_2- related fundamentals:

Assignment	Infrared	Raman
	cm^{-1}	cm^{-1}
$N^{14}—N^{14}$	.1296.0	1298, 1304
$N^{15}—N^{15}$	1252.1	1259
Ti—N^{14} (anti-sym.)	581.4	579
Ti—N^{15} (anti-sym.)	566.4	565
Ti—N^{14} (sym.)	—	526
Ti—N^{15} (sym.)	—	509

said cyclic dimeric form of the complex being a red brown solid, stable for at least one day at room temperature as a solid and in solution in electron donor solvents; said polymeric form of said complex having the following characteristic infrared absorption peaks arising from N-N and Ti-N stretching vibrations:

Assignment	Frequency (cm^{-1})
$N^{14}—N^{14}$	1221.9 ± 0.3
$N^{15}—N^{15}$	1182.2 ± 0.3
$Ti—N^{14}$(anti-sym)	592.4 ± 0.3
$Ti—N^{15}$(anti-sym)	581.4 ± 0.5

said polymeric form being a black solid and being very sparingly soluble in 1,2-dimethoxymethane.

4,024,170
LIQUID CLATHRATES

Jerry L. Atwood, Tuscaloosa, Ala., assignor to The University of Alabama, University, Ala.

Filed Nov. 11, 1975, Ser. No. 630,912
Int. Cl.² C07F *11/00*
U.S. Cl. 260—438.5 R **5 Claims**

1. Complex nitrate salt containing molecules of the formula comprising:

$$M\ Al_2[(CH_2)_xCH_3]_2NO_3$$

wherein M is potassium, rubidium, cesium, tetraalkylammonium, tetraarylammonium, tetraalkylphosphonium or tetraarylphosphonium and x is an integer from 1 to 3.

5. Liquid clathrates of the formula:

$$M\left\{Al_2[(CH_2)_xCH_3]_2NO_3\right\} \cdot NY$$

wherein M and x are as defined in Claim 1, n is a value from 1.5 to 30 and Y is an aromatic compound selected from the group consisting of benzene, toluene, o-, m- and p-xylene, mesitylene, tetramethylbenzene, ethylbenzene, diethylbenzene, cumene, trimethylbenzene, dipropylbenzene, diisopropylbenzene, naphthalene, tetralin, anthracene, and phenanthrene; or an organometallic compound selected from the group consisting of trimethylaluminum, ferrocene and dibenzenechromium.

4,024,171
ALUMINUM BORATE CATALYST COMPOSITIONS AND USE THEREOF IN CHEMICAL CONVERSIONS

Dennis P. McArthur, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 591,352, June 30, 1975, which is a continuation of Ser. No. 307,031, Nov. 16, 1972, abandoned.
This application Jan. 19, 1976, Ser. No. 650,513
Int. Cl.² C07C *1/04*
U.S. Cl. 260—449.6 M **9 Claims**

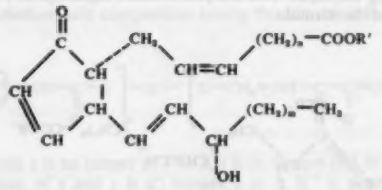
1. A process for the hydrogenation of carbon oxides to produce methane, which comprises contacting a feed gas comprising hydrogen and an oxide of carbon with a catalyst comprising nickel dispersed on a porous, crystalline aluminum borate support at a temperature between about 600° and 1500° F, and recovering from said contacting a methane-enriched product gas, said aluminum borate support having a surface area of at least about 1 m^2/g.

4,024,172
PREPARATION OF PROSTANOIC ACID DERIVATIVES

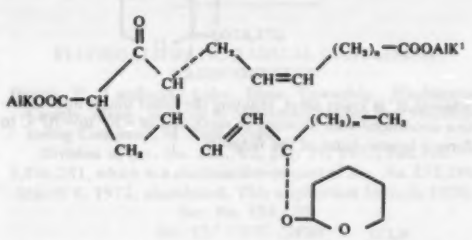
Jacques Martel, Bondy; Jean Buendia, Fontenay-sous-Bois, and Edmond Toromanoff, Paris, all of France, assignors to Roussel-UCLAF, Paris, France

Filed Aug. 30, 1971, Ser. No. 176,234
Claims priority, application France, Sept. 4, 1970, 70.32255; Nov. 30, 1970, 70.42924
Int. Cl.² C07C *177/00*
U.S. Cl. 260—468 D **7 Claims**

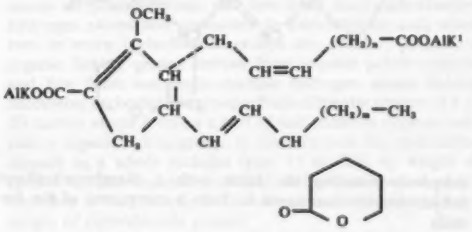
1. A process for the preparation of an ester compound of the formula



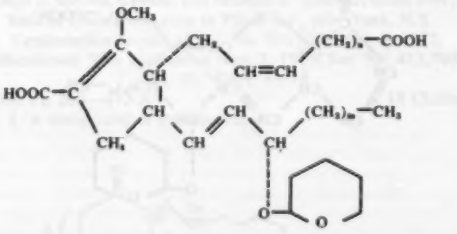
wherein R′ is lower alkyl, n is 2, 3 or 4 and m is 3, 4 or 5 comprising reacting a compound of the formula



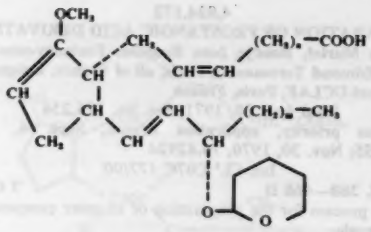
wherein AlK and AlK¹ are lower alkyl with a methylating agent to form a compound of the formula



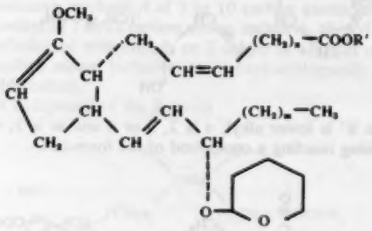
saponifying the said compound with a basic agent to form a compound of the formula



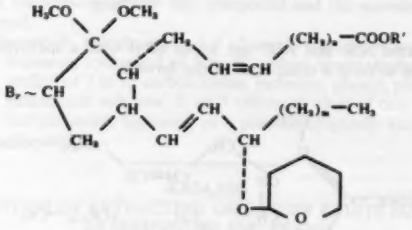
heating the said compound 50° to 120° C to form a compound of the formula



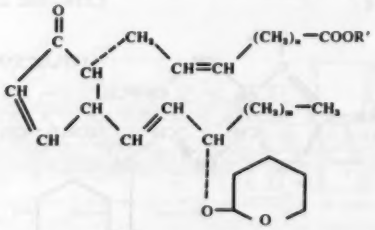
reacting the latter with an esterification agent to obtain an ester of the formula



wherein R' is lower alkyl, reacting the latter under mild selective conditions with bromine in methanol at −30° to −70° C to form a bromo ketal of the formula



dehydrobrominating the latter with a diazabicycloalkene dehydrobromination agent to form a compound of the formula



and subjecting the latter to said hydrolysis to form the said ester.

4,024,173

PROCESS FOR THE MANUFACTURE OF CYCLOHEXENE DICARBOXYLIC ACID ESTERS

Arnold Lenz, Cologne-Stammheim; Otto Bleh, Bergheim, Sieg, and Harald von Metnitz, Ranzel, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 161,339, July 9, 1971, abandoned, which is a continuation-in-part of Ser. No. 160,061, July 6, 1971, abandoned, which is a continuation of Ser. No. 757,103, Sept. 3, 1968, abandoned. This application Dec. 10, 1974, Ser. No. 531,419

Claims priority, application Germany, Sept. 2, 1967, 54002

Int. Cl.[2] C07C *67/30*

U.S. Cl. 260—468 K **13 Claims**

1. A process for hydrogenating a diesterified benzene dicarboxylic acid which comprises contacting an alkali metal amalgam, a benzene dicarboxylic acid ester having at least 2 carbon atoms in the ester group and an alcohol having at least 2 and up to 18 carbon atoms at a temperature of about 20° to 200° C.

4,024,174

TRANES-DELTA 2-PROSTAGLANDINS

Masaki Hayashi; Seiji Kori; Hirohisa Wakatsuka, all of Takatsuki, and Yoshitaka Konishi, Takarazuka, all of Japan, assignors to Ono Pharmaceutical Company, Osaka, Japan

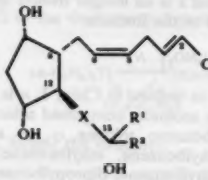
Filed Dec. 19, 1964, Ser. No. 534,509

Claims priority, application Japan, Dec. 25, 1973, 48-143738; Dec. 29, 1973, 49-3726

Int. Cl.[2] C07C *177/00*

U.S. Cl. 260—468 D **13 Claims**

1. A compound of the formula:



wherein R_1 represents an alkyl group containing from 1 to 10 carbon atoms, or an alkyl group containing from 1 to 6 carbon atoms carrying a phenyl substituent or a cycloalkyl substituent of 5 to 7 carbon atoms, R_2 represents a hydrogen atom or an alkyl group containing from 1 to 4 carbon atoms, X represents ethylene or trans-vinylene, and R^3 represents a hydrogen atom or an alkyl group containing from 1 to 12 carbon atoms, the double bonds in the 2- and 5-positions being in the trans- and cis-configurations respectively, and cyclodextrin clathrates thereof, and non-toxic salts of the acids wherein R^3 represents a hydrogen atom.

4,024,175

CYCLIC AMINO ACIDS

Gerhard Satzinger, Denzlingen; Johannes Hartenstein, Wittental; Manfred Herrmann, St. Peter, and Wolfgang Heldt, Wasser, all of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

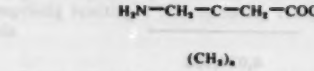
Filed Dec. 31, 1975, Ser. No. 645,724

Claims priority, application Germany, Dec. 21, 1974, 2460891

Int. Cl.[2] C07C *101/04, 101/18*

U.S. Cl. 260—468 J **11 Claims**

1. Compounds of the general formula:



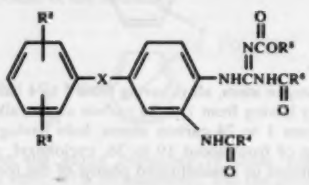
wherein R_1 is a hydrogen atom or a lower alkyl radical and *n* is 4, 5 or 6; and the pharmacologically compatible salts thereof.

4,024,176
SUBSTITUTED PHENYLGUANIDINES AND PROCESSES FOR THEIR PREPARATION AND USE

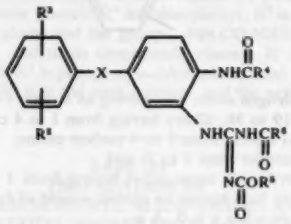
Heinrich Kölling, Haan; Herbert Thomas, Wuppertal-Elberfeld; Arno Widdig, Blecher, and Hartmund Wollweber, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 572,224, April 28, 1975, Pat. No. 3,993,682. This application May 26, 1976, Ser. No. 690,075
Claims priority, application Germany, May 15, 1974, 2423679
Int. Cl.² C07C *149/40*
U.S. Cl. 260—470 **19 Claims**

1. A member selected from the group consisting of an N-(4-substituted-2-amidophenyl)guanidine compound of the formula:



and an N-(5-substituted-2-amidophenyl)guanidine of the formula:



wherein

X is sulfinyl or sulfonyl;

R^4 is alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkoxy of 1 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, amino, alkylamino of 1 to 6 carbon atoms or dialkylamino wherein each alkyl group contains 1 to 6 carbon atoms;

R^5 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms or alkynyl of 2 to 6 carbon atoms; and

R^6 is hydrogen, alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbo atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkenyloxy of 2 to 6 carbon atoms, alknynloxy of 2 to 6 carbo atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms

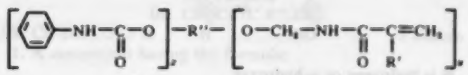
each of R^2 and R^3 independent of the other is hydrogen, halogeno, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkylthio 1 to 6 carbon atoms, trifluoromethyl, alkanoyl of 1 to 6 carbon atoms, amino, alkanoylamino of 1 to 6 carbon atoms, or carbalkoxy of 2 to 7 carbon atoms.

4,024,177
PHENYL ISOCYANATE DERIVATIVES OF RADIATION CURABLE OLIGOMERS

Stuart A. Harrison, 4432 Colfax Ave., Minneapolis, Minn. 55440

Filed Oct. 8, 1975, Ser. No. 620,674
Int. Cl.² C07C *125/06*
U.S. Cl. 260—472 **1 Claim**

1. A composition of matter capable of curing upon exposure to radiation, said composition having the structural formula:



wherein *x* is an integer of 1 to 2, *y* is an integer of 1 to 2, and the sum of *x* and *y* is an integer 2 to 3, R'' is a saturated aliphatic hydrocarbon group containing from 2 to 6 carbon atoms or a cycloaliphatic group containing 6 to 15 carbon atoms and R' is a hydrogen or methyl group.

4,024,178
FLUOROALIPHATIC RADICAL CONTAINING CARBODIIMIDES

Dennis P. Landucci, Lake Elmo Township, Washington County, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 380,702, July 19, 1973, Pat. No. 3,896,251, which is a continuation-in-part of Ser. No. 232,186, March 6, 1972, abandoned. This application Mar. 3, 1975, Ser. No. 554,420
Int. Cl.² C07C *125/06*
U.S. Cl. 260—472 **2 Claims**

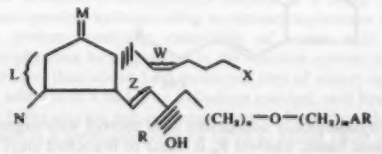
1. A solvent-soluble fluoroaliphatic radical-containing carbodiimide consisting essentially of from 1 to a plurality of carbodiimide groups, terminal organic radicals derived from mono- or polyisocyanate and free from isocyanate-reactive hydrogen atoms and connected to carbodiimide and, when two or more carbodiimide groups are present, polyvalent organic linking groups derived from organic polyisocyanate and free from isocyanate-reactive hydrogen atoms linking successive carbodiimide groups; fluoroaliphatic groups of 3 to 20 carbon atoms forming a part of said terminal organic radicals or organic linking groups in amounts such that said carbodiimide as a whole includes from 15 to 45% by weight of carbon-bonded fluorine and said carbodiimide as a whole exclusive of fluoroaliphatic radicals contains at least 12% by weight of carbodiimide groups.

4,024,179
SUBSTITUTED ω-PENTANORPROSTAGLANDINS

Jasjit S. Bindra, Groton, and Michael R. Johnson, Gales Ferry, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 304,813, Nov. 8, 1972, abandoned. This application Nov. 7, 1973, Ser. No. 413,708
Int. Cl.² C07C *69/74*
U.S. Cl. 260—473 A **18 Claims**

1. A compound of the structure:



and its C_{15} epimer;

wherein Ar is phenyl, 3,4-dimethoxyphenyl, 3,4-methylenedioxyphenyl, 3,4,5-trimethoxyphenyl; α - or β-naphthyl or mono-substituted phenyl wherein said substituent is halo, trifluoromethyl, phenyl, lower alkyl or lower alkoxy;

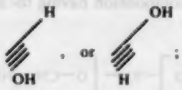
R is hydrogen or lower alkyl;

n and *m* are each integers from 0 to 3 with the proviso that the sum of *n* and *m* does not exceed 3;

W and L are each a single bond or cis double bond;

Z is single bond or trans double bond;

M is keto,



N is hydrogen or α-hydroxyl;

X is p-phenyl-phenoxycarbonyl;

and wherein L, M and N are so selected as to complete the structure of a prostaglandin of the A, E, or F series.

4,024,180

PROCESS FOR THE PRODUCTION OF PERACETIC ACID

Nobuto Ohta, Tokyo; Juichi Imamura, Chofu, and Takehiko Matsuzaki, Tokyo, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed May 8, 1968, Ser. No. 732,800

Claims priority, application Japan, Nov. 27, 1967, 42-74679; Dec. 12, 1967, 42-79258; Jan. 18, 1968, 43-2366; Feb. 24, 1968, 43-11373; Feb. 24, 1968, 43-11374; Mar. 5, 1968, 43-13809

Int. Cl.² C07C *179/12*

U.S. Cl. 260—502 A **6 Claims**

1. A process for the production of peracetic acid which comprises the steps of adding, to an inert solvent selected from the group consisting of acetone, ethyl acetate, methyl ethyl ketone, methyl acetate and benzene, acetaldehyde and at least one catalyst selected from the group consisting of strongly acidic carboxylic acids having a pKa value of less than 4.6. strongly acidic phenls containing (i) 1-2 hydroxy groups and (ii) said phenol also containing (a) more than two nitro groups of (b) more than three strong electron withdrawal groups, and nitric acid, and introducing oxygen gas or oxygen-containing gas into the resulting mixture while stirring said mixture and maintaining it at a temperature range of −5° C to 50° C.

4,024,181

ANALOGUES OF PROSTANOIC ACIDS

Milos Babej, Frankfurt am Main; Wilhelm Bartmann, Neuenhain, Taunus; Gerhard Beck, Frankfurt am Main, and Ulrich Lerch, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

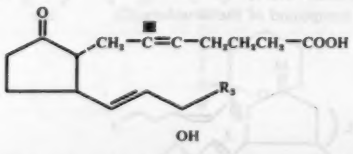
Filed Nov. 19, 1974, Ser. No. 525,174

Claims priority, application Germany, Nov. 21, 1973, 2357953

Int. Cl.² C07C *177/00*

U.S. Cl. 260—514 D **3 Claims**

1. A compound of the formula



and physiologically acceptable salts thereof with organic and inorganic bases, wherein R_3 is linear or branched alkyl having 1 to 10 carbon atoms substituted by O-alkyl having 1 to 5 carbon atoms.

4,024,182

PREPARATION OF ARYL-BUTADIENOIC ACIDS

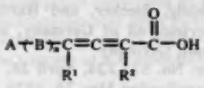
Faizulla G. Kathawala, West Orange, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Aug. 15, 1975, Ser. No. 605,153

Int. Cl.² C07C *51/00*

U.S. Cl. 260—521 R **9 Claims**

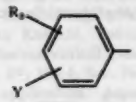
1. A process for the preparation of a compound of the formula



wherein

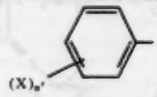
n is 0 or 1;

A is



wherein Y

is a hydrogen atom, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 24 carbon atoms, alkylthio having from 1 to 24 carbon atoms, halo having an atomic weight of from about 19 to 36, cyclohexyl, phenoxy or substituted or unsubstituted phenyl of the formula

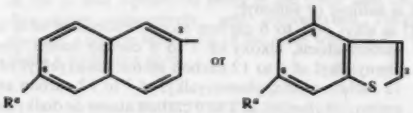


wherein

X is a hydrogen atom, halo having an atomic weight of from about 19 to 36, alkoxy having from 1 to 4 carbon atoms or alkyl having from 1 to 4 carbon atoms;

n′ is an integer from 1 to 2; and

R^3 is a hydrogen atom, alkyl having from 1 to 3 carbon atoms or halo having an atomic weight of from about 19 to 36; or when n is 0 A is



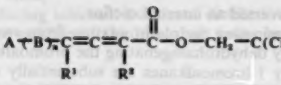
wherein

R^a is a hydrogen atom, halogen having an atomic weight of from about 19 to 36, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms, alkylthio having from 1 to 4 carbon atoms, or difluoromethoxy;

B is

wherein each of R^4 and R^5 is alkyl having from 1 to 3 carbon atoms which may be like or unlike; and

each of R^1 and R^2, independently, is a hydrogen atom or alkyl having from 1 to 4 carbon atoms;
comprising reacting a corresponding compound of the formula



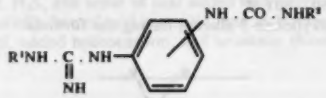
in which A, B, n, R^1 and R^2 are as defined above, at a temperature of from about 20° to 35° C., in the presence of zinc-copper in finely divided form in dimethylformamide, under essentially anhydrous conditions.

4,024,183
ANTIVIRAL GUANIDINO-URLIDO-BENZENE COMPOUNDS

Douglas Lintin Swallow, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 209,381, Dec. 17, 1971, abandoned. This application Oct. 6, 1975, Ser. No. 620,049
Claims priority, application United Kingdom, Jan. 7, 1971, 777/71
Int. Cl.² C07C *127/19*; A61K *31/17*
U.S. Cl. 260—553 A **5 Claims**

1. A compound of the formula:



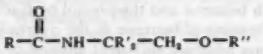
selected from the group consisting of those compounds wherein R^1 is ethyl, R^2 is bromophenyl, and the group —NH.CO.NHR² is in the meta-position, those compounds wherein R^1 is isopropyl, isobutyl, isopentyl or phenyl, R^2 is chlorophenyl, bromophenyl, nitrophenyl, ethoxyphenyl or tolyl and the group —NH.CO.NHR² is in the meta- or para-position, those compounds wherein R^1 is chlorophenyl, R^2 is alkyl of 3 to 10 carbon atoms and the group —NH.CO.NHR² is in the meta-position, and those compounds wherein R^1 is chlorophenyl or tolyl, R^2 is phenyl or o-chlorophenyl and the group —NH.CO.NHR² is in the para-position, and the acid addition salts thereof.

4,024,184
PREPARATION OF N-(2-ALKOXYETHYL)ALKANAMIDES AND 2-ALKOXYETHYL AMINES FROM 2-OXAZOLINES

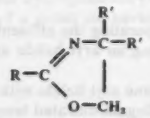
Mark E. Kaiser, and Peter W. Owen, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 21, 1976, Ser. No. 698,446
Int. Cl.² C07C *102/00*, *85/00*
U.S. Cl. 260—561 R **12 Claims**

1. A process for the preparation of an N-(2-alkoxyethyl)alkanamide of the formula



comprising reacting by contacting, in liquid phase, an oxazoline of the formula



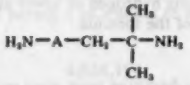
with an alkanol of the formula R''OH in the presence of a catalytic amount of an alkali metal or derivative thereof; wherein R is hydrogen or an alkyl radical containing from 1 to about 17 carbon atoms; each R' independently is hydrogen, methyl or ethyl; R'' is methyl or ethyl.

4,024,185
CYCLOALIPHATIC UNSYMMETRICAL DIAMINES

Lester T. C. Lee, Parsippany, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 394,606, Sept. 5, 1973, abandoned, which is a division of Ser. No. 143,186, May 13, 1971, Pat. No. 3,776,890. This application Dec. 4, 1974, Ser. No. 529,438
Int. Cl.² C07C *87/38*
U.S. Cl. 260—563 R **5 Claims**

1. A compound having the formula:



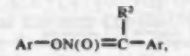
which comprises substantially trans-isomer and wherein A is p-cycloaliphatic radical having 6 to 15 carbon atoms.

4,024,186
NITROALKANE BASED HINDERED PHENOL COMPOUNDS AND METHODS OF PREPARATION THEREOF

Harry Dounchis, Lawrenceville, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 475,318, May 31, 1974, abandoned. This application Apr. 30, 1976, Ser. No. 681,838
Int. Cl.² C07C *131/00*
U.S. Cl. 260—566 AE **9 Claims**

1. A compound selected from the group having the formula



wherein Ar represents a 3,5-di-tertiary-butyl-4-hydroxybenzyl radical and R_5 represents a lower C_1–C_4 alkyl or a methoxy or ethoxy substituted lower C_1–C_4 alkyl radical.

4,024,187
PREPARATION OF M-AMINO-α-METHYLBENZYL ALCOHOL

William Michalowicz, Lock Haven, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Filed May 24, 1974, Ser. No. 473,230
The portion of the term of this patent subsequent to May 3, 1994, has been disclaimed.
Int. Cl.² C07C *85/11*
U.S. Cl. 260—580 **6 Claims**

1. A process for the facile conversion of m-nitroacetophenone into m-amino-α-methylbenzyl alcohol in a single step process comprising hydrogenating m-nitroacetophenone in a reaction system consisting essentially of water; said m-nitroacetophenone being present in the reaction system in an amount of less than about 1.66 moles per liter of water; and a catalytic amount of a nickel or palladium catalyst; said hydrogenation being carried out at a temperature of less than about 105° C and at a hydrogen pressure of 25 to about 1000 psi.

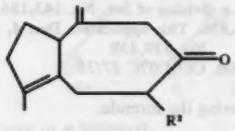
4,024,188
ODORANT

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 363,207, May 23, 1973, Pat. No. 3,935,253. This application Nov. 3, 1975, Ser. No. 628,302
Claims priority, application Switzerland, June 5, 1972, 8265/72
Int. Cl.² C07C 49/54
U.S. Cl. 260—586 F 2 Claims

1. A compound of the formula

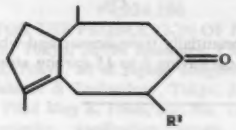
VII



wherein R^2 represents hydrogen or lower alkyl.

2. A compound of the formula

IX

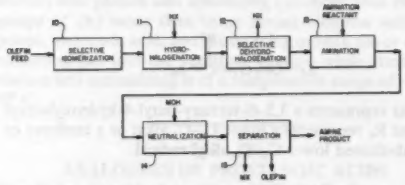


wherein R^2 represents hydrogen or lower alkyl.

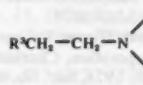
4,024,189
CHEMICAL PROCESS

Wayne T. Davis, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed June 2, 1975, Ser. No. 582,628
Int. Cl.² C07C 85/02
U.S. Cl. 260—585 A 17 Claims



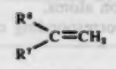
3. A process for preparing amines of the formula:



from olefins of the formula $R^3CH=CH_2$ in admixture with internal olefins or olefins of the formula

wherein R^1, R^2 and R^3 are hydrogen or alkyl having from 1 to about 24 carbon atoms, R^6 and R^7 being alkyl having from 1 to about 24 carbon atoms, which comprises:

A. subjecting the olefin mixture to a selective isomerization wherein



olefins are converted to internal olefins,

B. hydrobrominating the olefin mixture from step A,

C. selectively dehydrohalogenating the bromoalkanes from B whereby 1-bromoalkanes are substantially unaffected and secondary bromoalkanes are converted to olefins,

D. subjecting to amination with an amine having at least one replaceable hydrogen atom the 1-bromoalkanes from step C whereby the 1-bromoalkanes are converted to amine hydrobromides,

E. converting amine hydrobromides in the product from D into amines and

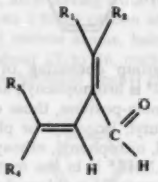
F. recovering the amines thus produced.

4,024,190
NOVEL LOWER ALKENALS

Anne Hruza nee Sanderson, Bricktown; William L. Schreiber, Jackson, both of N.J.; Michel van Praag, Tilburg, Netherlands; Alan O. Pittet, Atlantic Highlands, and William J. Evers, Red Bank, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 383,578, July 30, 1973, Pat. No. 3,970,701. This application May 5, 1976, Ser. No. 683,293
Int. Cl.² C07C 47/02; C11B 9/00
U.S. Cl. 260—601 R 7 Claims

1. A 2-alkylidene-3-alkenal having the formula:



wherein one of R_1 and R_2 is hydrogen and the other is methyl and one of R_3 and R_4 is hydrogen and the other is an alkyl group containing two or four carbon atoms, selected from the group consisting of:

cis-2-ethylidene-trans-3-hexenal;
cis-2-ethylidene-cis-3-hexenal;
trans-2-ethylidene-trans-3-hexenal;
trans-2-ethylidene-6-methyl-cis-3-heptenal; and
trans-2-ethylidene-6-methyl-trans-3-heptenal.

4,024,191
FRACTIONAL DISTILLATION PROCESS

Jack S. Scoggin, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 1, 1976, Ser. No. 672,811
Int. Cl.² C07C 149/28
U.S. Cl. 260—609 D 12 Claims

1. A method for separating H_2S and HCl overhead from admixture with benzene and thiophenol by fractional distillation without freezing of benzene in the overhead condensers which comprises adding a sufficient amount of a light hydrocarbon having a boiling point lower than benzene to said admixture being fed to said fractional distillation to prevent benzene from being taken overhead and to lower the bottoms temperature sufficiently to minimize thiophenol product decomposition.

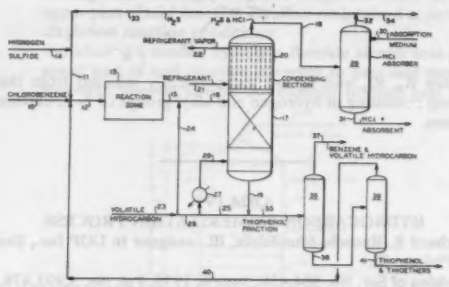
8. A method for separating the effluent for producing aromatic thiols by reacting an aryl halide and H_2S which comprises:

a. reacting at least one aryl halide with H_2S under reaction conditions including an elevated temperature and a time

sufficient to form a reaction effluent comprising aromatic thiol, hydrogen halide, H_2S, unreacted aryl halide, aromatic, and aromatic thioethers,

b. passing said reaction effluent as feed to a fractional distillation zone,

c. introducing into said fractional distillation zone a paraffinic or naphthenic hydrocarbon lower boiling than said



aromatic, the amount of added hydrocarbon being sufficient to prevent said aromatic from being taken overhead from said distillation zone, and

d. subjecting said feed and added hydrocarbon to fractional distillation conditions to take as overhead hydrogen halide, H_2S, and some of said added hydrocarbon, but substantially free of said aromatic, and as bottoms aromatic thiol, added hydrocarbon, and aromatic thioethers.

4,024,192
PERFLUOROCYCLOHEXYL ETHERS

Siegfried Benninger, Schwalbach, Taunus, and Thomas Martini, Neuenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

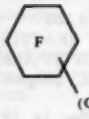
Filed Oct. 8, 1974, Ser. No. 513,080

Claims priority, application Germany, Oct. 10, 1973, 2350803

Int. Cl.² C07C *43/18*

U.S. Cl. 260—611 R **5 Claims**

1. A compound having the formula



wherein *b* is 3, 4, 5 or 6 and *x* is 2 or 3.

4,024,193
HOMOGENEOUS HYDROGENATION PROCESS

Walter M. Kruse, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 407,871, Oct. 19, 1973, Pat. No. 3,935,284. This application Nov. 7, 1975, Ser. No. 629,885

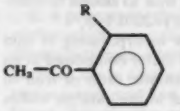
Int. Cl.² C07C *29/00, 29/14*

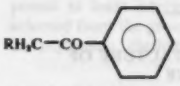
U.S. Cl. 260—618 D **17 Claims**

1. A homogeneous hydrogenation process comprising contacting a solution of a substrate having one of the following formulas

$RH_2C—CO—CH_2R$

-continued





wherein R is —Cl, —Br, —F or —OH, with hydrogen under positive pressure in the presence of a catalyst comprising a ruthenium triphenyl phosphine complex having the following general formula:

$RuHCl(PR'_3)_3$

wherein R′ is phenyl, p-methyl phenyl, or p-methoxy phenyl and a strong acid having a pKa equal to less than about 1.

4,024,194
PROCESS FOR THE PURIFICATION OF 9,9-BIS(4-HYDROXYPHENYL)-FLUORENE

John E. Corn, Jr., Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,461

Int. Cl.² C07C *37/24*

U.S. Cl. 260—619 A **2 Claims**

1. The process for purifying 9,9-bis(4-hydroxyphenyl)-fluorene containing as an impurity therein 9-(4-hydroxyphenyl)-9(2-hydroxyphenyl)-fluorene which comprises (1) forming a solution of the aforesaid two fluorenes in an amount of nitromethane which at elevated temperatures is sufficient to form a homogeneous solution, (2) cooling the solution to precipitate the 9,9-bis(4-hydroxyphenyl)-fluorene, and (3) removing the nitromethane solution containing the impurity and leaving behind the essentially pure 9,9-bis(4-hydroxyphenyl)-fluorene.

4,024,195
PROCESS FOR ALKYLATING THE ORTHO-POSITION OF PHENOL COMPOUNDS

Eiichi Yonemitsu, Kashiwa; Shizuo Togo; Kenichiro Hashimoto, both of Tokyo; Tomoyuki Yui, and Akihiko Sanada, both of Matsudo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

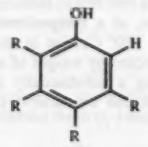
Filed Oct. 15, 1975, Ser. No. 622,507

Claims priority, application Japan, Oct. 22, 1974, 49-121779

Int. Cl.² C07C *39/06, 39/12, 39/17*

U.S. Cl. 260—621 R **10 Claims**

1. In a process of alkylating the ortho-position of a phenol compound by catalytically reacting a phenol compound expressed by the general formula



wherein each R independently represents a monovalent substituent selected from the group consisting of a hydrogen atom, alkyl containing 1 to 6 carbon atoms, phenyl and cyclohexyl, with a lower saturated aliphatic alcohol containing 1 to 4 carbon atoms in the gaseous phase at a temperature of 300° to 450° C. in the presence of a cata-

lyst which is a mixture of iron oxide, silica and chromium oxide in which the atomic ratio of iron to silicon to chromium is within the range of 100:0.1–20:0.1–5,

the improvement comprising further incorporating in said catalyst mixture at least one alkali metal compound in an amount sufficient to provide an atomic ratio of iron to silicon to chromium to alkali metal in the catalyst within the range of 100:01–20:0.1–5:0.01–5.

4,024,196
PROCESS FOR THE MANUFACTURE OF HYDROQUINONE

Hans Krekeler, Wiesbaden, and Werner Heinrich Müller, Kelkheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 5, 1975, Ser. No. 602,029
Claims priority, application Germany, Aug. 7, 1974, 2437929
Int. Cl.² C07C *39/08*
U.S. Cl. 260—621 H 8 Claims

1. A process for the manufacture of hydroquinone which comprises contacting cyclohexanedione-(1,4) with a solvent selected from the group consisting of polyglycol dialkyl ethers, wherein said alkyl contains up to 6 carbon atoms and a catalyst selected from the group consisting of the noble metals of Group VIII of the Periodic Table, at a pressure from about 0.5 to about 20 atmospheres and a temperature of from about 160° to 350° C, the amount of cyclohexanedione-(1,4) not being in excess of 50%, calculated on the weight of the liquid phase.

4,024,197
PRODUCTION OF BUTANEDIOL

Charles C. Cumbo, Wilmington; Kamlesh K. Bhatia, Newark, both of Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 493,741, July 31, 1974, Pat. No. 3,963,754. This application Dec. 31, 1975, Ser. No. 645,693
The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.
Int. Cl.² C07C *29/00*
U.S. Cl. 260—635 E 9 Claims

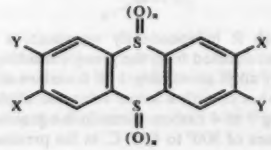
1. A process for the preparation of 1,4-butanediol and 2-methyl-1,3-propane diol by hydroformylating 2-vinyl-5-methyl-1,3-dioxane with carbon monoxide and hydrogen in the presence of a hydroformylation catalyst under conventional conditions and then hydrogenating and hydrolyzing the hydroformylation reaction product, in the presence of water and a hydrogenation catalyst under conventional conditions.

4,024,198
PROCESS FOR THE CHLORINATION OF TOLUENE

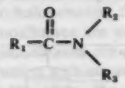
Harry E. Buckholtz, Kenmore, and Arun C. Bose, Tonawanda, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,692
Int. Cl.² C07C *25/06*, *25/08*
U.S. Cl. 269—650 R 14 Claims

1. In the process for the nuclear chlorination of alkylbenzenes which comprises reacting in the liquid phase, and alkylbenzene with chlorine, at a temperature from below about −25° to above about 150° Celsius in the presence of about 0.01 to about 10.0 percent by weight of a para-directing catalyst system comprising a substantially iron-free Lewis acid catalyst and a thianthrene co-catalyst characterized by the formula:



wherein n is 0 to 1, x is an electron-withdrawing substituent and Y is hydrogen or an electron-withdrawing substituent, in the presence of iron or an ally thereof the improvement which comprises carrying out said process in the presence of an amide characterized by the formula:



where R_1, R_2, and R_3 are independently selected from the group consisting of hydrogen and alkyl groups of 1–12 carbon atoms.

4,024,199
HYDROCARBON ISOMERIZATION PROCESS

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 584,438, June 6, 1975, Pat. No. 3,992,476, which is a continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application June 7, 1976, Ser. No. 693,663
Int. Cl.² C07C *5/30*
U.S. Cl. 260—668 A 10 Claims

1. A process for isomerizing an alkylaromatic hydrocarbon which comprises contacting said hydrocarbon at isomerization conditions with a catalytic composite comprising a porous alumina carrier containing, on an elemental basis, about 0.01 to about 2 weight percent platinum or palladium, about 0.01 to about 2 weight percent rhodium, about 0.01 to about 5 weight percent tin and about 0.1 to about 10 weight percent halogen, wherein said platinum or palladium, rhodium and tin are uniformly dispersed throughout said alumina carrier, wherein substantially all of said platinum or palladium and rhodium are present in the corresponding elemental metallic states and wherrein substantially all of said tin is present in an oxidation state above that of the elemental metal.

4,024,200
COUNTERCURRENT FLOW REACTION CHAMBER FOR PLURAL STAGES OF HF ALKYLATION

Bipin V. Vora, Wheeling, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 533,422, Dec. 16, 1974, abandoned. This application May 5, 1976, Ser. No. 683,354
Int. Cl.² C07C *3/54*
U.S. Cl. 260—671 R 8 Claims

1. A process for producing an alkylation reaction product from an alkylatable reactant selected from the hydrocarbon group consisting of aromatic, branched paraffin and linear paraffin; and an olefin-acting reactant utilizing a hydrogen fluoride catalyst which comprises:

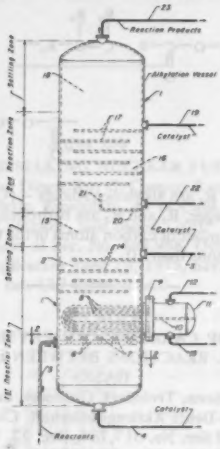
a. introducing a first hydrogen fluoride stream into an intermediate part of a vertically-extended reaction chamber to pass said first stream downwardly through a first alkylation zone in the lower part of said reaction chamber maintained at first alkylation reaction conditions and withdrawing said first stream from the bottom part of said reaction chamber;

b. introducing said alkylatable and said olefin-acting reactants into the lower part of said first alkylation zone and passing said reactants upwardly through said reaction chamber in contact with said descending first hydrogen fluoride stream to form a first alkylate reaction mixture;

c. passing said reaction mixture from step (b) upwardly in said reaction chamber through a first settling zone maintained at settling conditions to settle a hydrocarbon phase from an entrained catalyst phase in said first reaction mixture and passing said catalyst phase downwardly through said first alkylation zone in admixture with said first hydrogen fluoride stream;

d. passing said hydrocarbon phase upwardly from said first settling zone through a second alkylation zone in the upper part of said reaction chamber maintained at second alkylation reaction conditions;

e. introducing a second hydrogen fluoride stream into said upper part of said reaction chamber to pass said second hydrogen fluoride stream downwardly through said second alkylation reaction zone in contact with said ascending hydrocarbon phase to form a second alkylate reaction mixture and withdrawing said second hydrogen fluoride stream from the lower part of said second alkylation reaction zone;



f. passing said reaction mixture from step (e) upwardly from said second alkylation zone through a second settling zone to settle a hydrocarbon phase from an entrained catalyst phase in said second reaction mixture and passing said catalyst phase downwardly through said second alkylation zone in admixture with said second hydrogen fluoride stream, and

g. withdrawing the hydrocarbon phase from said second settling zone and recovering said alkylation reaction product therefrom.

4,024,201
PROCESS FOR THE SELECTIVE DISPROPORTIONATION REACTION OF OLEFINS

Tadao Takahashi, Kawaguchi, Japan, assignor to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Aug. 25, 1975, Ser. No. 607,703

Claims priority, application Japan, Aug. 26, 1974, 49-97693; Sept. 6, 1974, 49-103151; Dec. 7, 1974, 49-141035

Int. Cl.² C07C *3/62*

U.S. Cl. 260—683 D **10 Claims**

1. A process for the selective disproportionation reaction of olefins which comprises heating an olefin in a reaction zone to disproportionation temperature in the presence of a supported tunsten oxide catalyst and of an initial amount of at least one halogen compound and as the disproportionation reaction continues, introducing additional amounts of such halogen compound at least intermittently, said halogen compound being selected from the group consisting of chloroform, carbon tetrachloride, dibromomethane, 1,1-dibromoethane and butyl bromide.

6. A process for the selective disproportionation reaction of olefins which comprises heating an olefin in a reaction zone to disproportionation temperature in the presence of a supported tungsten oxide catalyst and of an initial amount of at least one amine compound and as the disproportionation reaction continues, introducing additional amounts of said amine compound at least intermittently, said amine compound being selected from the group consisting of ammonia, n-butylamine, isobutylamine, diethylamine, triethylamine and piperidine.

4,024,202
OLIGOMERISATION PROCESS

David Robert Burnham, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed May 28, 1975, Ser. No. 581,482

Claims priority, application United Kingdom, June 6, 1974, 25094/74

Int. Cl.² C07C *3/10*

U.S. Cl. 260—683.15 D **11 Claims**

1. A process for the oligomerisation of ethylene which comprises contacting the ethylene with a compound of a metal of Group VIII of the Periodic Table of the Elements supported on an inorganic particulate material having a hydroxylic surface substantially free from adsorbed moisture, the said compound being one having two hydrocarbyl or substituted hydrocarbyl groups bonded to the metal, one of said groups being capable of reacting with the hydroxylic surface of the support, provided that both of said two hydrocarbyl groups are not π-bonded to said nickel and provided that the total number of centers on the ligands involved in π-bonding does not exceed 6.

4,024,203
OLIGOMERIZATION OF UNSATURATED HYDROCARBONS WITH ACID CATALYSTS

Bernard Torck, Chatou; Georges Vidouta, Neuilly sur Seine; Peirre Pariot, Colombes, and Michel Hellin, Andresy, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Continuation of Ser. No. 319,610, Dec. 29, 1972, abandoned, which is a continuation-in-part of Ser. No. 277,084, Aug. 1, 1972, abandoned, which is a division of Ser. No. 89,462, Nov. 13, 1970, abandoned. This application Jan. 16, 1976, Ser. No. 649,845

Claims priority, application France, Nov. 24, 1969, 69.40466

Int. Cl.² C07C *3/12*, *3/14*

U.S. Cl. 260—683.15 A **14 Claims**

1. A process for the oligomerization of a mono alpha-ethylenically unsaturated lower aliphatic hydrocarbon to predominantly dimers and trimers thereof which comprises oligomerizing the unsaturated hydrocarbon in the presence of a liquid catalyst consisting essentially of:

a. a catalytic amount of a Bronsted acid selected from the group consisting of sulfuric acid; fluorosulfuric acid; a sulfonic acid of the formula $R—SO_3H$ wherein R is alkyl, aromatic, halogenated alkyl or halogenated aromatic; HF; an acid of the formula

$$X_nPO_nH(OR_1)_{3-n}$$

wherein X is a halogen, R_1 is a hydrogen atom or an alkyl group and n is selected from 0, 1 and 2; and an acid of the formula:

$$CX_nH_{3-n}COOH$$

wherein X is a halogen and n is selected from 0, 1, 2 and 3, and

b. a sulfone of formula $R''—SO_2—R'$, wherein R' and R'', taken separately, are hydrocarbon monovalent radicals

containing from 1 to 8 carbon atoms or, taken together, form a hydrocarbon divalent radical containing from 3 to 12 carbon atoms, the acid catalyst concentration being between 10^{-5} moles per liter of sulfone and the concentration corresponding to the saturation, without exceeding 5 moles per liter, said liquid catalyst being a liquid phase distinct from the hydrocarbon phase.

4,024,204

ANTISTATIC POLYBUTYLENE TEREPHTHALATE MOLDING COMPOSITIONS CONTAINING ALKOXYLATED POLYAMIDE

Karl Schlichting, Bobenheim-Roxheim; Ludwig Beer, Ludwigshafen, and Wolfgang Seydl, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed June 30, 1975, Ser. No. 591,416

Claims priority, application Germany, July 31, 1974, 2436871

Int. Cl.² C08L 77/00

U.S. Cl. 260—857 PE 2 Claims

1. Polybutylene terephthalate molding compositions showing a reduced tendency to electrification which comprises polybutylene terephthalate having a relative viscosity of from 1.3 to 1.8 as determined on a 0.5% solution at 25° C in a 3:2 mixture of phenol and o-dichlorobenzene, said polybutylene terephthalate containing from 0.5 to 20% by weight, based on the weight of polyester, of an alkoxylated polyamide finely dispersed therein, wherein said alkoxylated polyamide is the reaction product of monomeric alkylene oxides with polyamides in the ratio of 0.5:1 to 100:1, by weight.

4,024,205

SYNTHETIC POLYMER COMPOSITION HAVING ENHANCED ANTISTATIC PROPERTIES

Robert Bernard Login, Woodhaven, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 22, 1975, Ser. No. 643,448

Int. Cl.² C08L 67/06, 77/00

U.S. Cl. 260—857 PG 10 Claims

1. An antistatic composition comprising a synthetic polymer and from 1% to 15% by weight based on the weight of the polymer of a polyoxyalkylated polyol polyester containing ionic groups, said polyester prepared by the reaction of an alkylene oxide adduct of a nitrogen-containing compound having a molecular weight from about 1,000 to 40,000 and an alkylene oxide content of from about 60% to 90% by weight, said alkylene oxide content being at least 10% by weight ethylene oxide, with (a) a metal salt of an acidic derivative of an alkyl ester of an organic polycarboxylic acid or anhydride or (b) an alkoxide-generating reagent followed by reaction with a polycarboxylic anhydride, anhydride acid chloride or anhydride ester, employing an equivalent ratio of ester group to hydroxyl group of from about 0.25:1 to 0.5:1.

4,024,206

STABILIZED BROMINATED POLYESTERS

Carl H. Fintelmann, Rancho Palos Verdes, and Oscar C. Zaske, Palos Verdes Estates, both of Calif., assignors to Vistron Corporation, Cleveland, Ohio

Filed Nov. 19, 1975, Ser. No. 633,281

Int. Cl.² C08K 5/34, 5/53

U.S. Cl. 260—865 3 Claims

1. An unsaturated polyester resin-monomer mixture in which the polyester contains from about 4 to 40% by weight of bound bromine in the form of dibromoneopentyl glycol moieties in the resin containing from 1 to 10 parts by weight per 100 weight of resin-monomer of dimethyl methy phosphonate.

4,024,207

DIETHYL HYDROXYMETHYLPHOSPHONATE ESTERS, THEIR PREPARATION AND USE

Jean-Marie J. Biehler, Brunstatt; Serge L. Lecolier, Janville sur Juine, and Patrice M. Le Roy, Ballancourt, all of France, assignors to Societe Nationale des Poudres et Explosifs, France

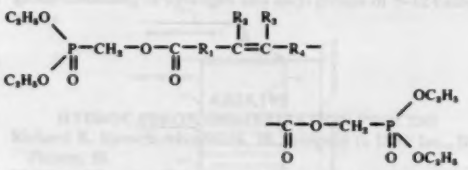
Filed June 25, 1975, Ser. No. 590,124

Claims priority, application France, July 4, 1974, 74.23261

Int. Cl.² C07F 9/32

U.S. Cl. 260—932 2 Claims

1. Diesters of diethyl hydroxymethylphosphonate of the formula:



wherein R_1 and R_4 are alkylene radicals $-(CH_2)_m-$, in which m is 0 or an integer, R_2 and R_3 are hydrogen or alkyl radicals, and the total number of carbon atoms in the radicals R_1, R_2, R_3 and R_4 is not more than 10.

4,024,208

DEVICE FOR CARRYING OUT PHYSICAL AND/OR CHEMICAL REACTIONS BETWEEN LIQUIDS AND GASES

Wilhelm Wetteborn, Troisdorf, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

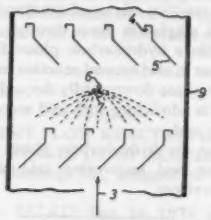
Continuation of Ser. No. 317,784, Dec. 22, 1972, abandoned.

This application Mar. 28, 1975, Ser. No. 562,821

Claims priority, application Germany, Dec. 22, 1971, 2163745

Int. Cl.² B01F 3/04

U.S. Cl. 261—112 5 Claims



1. Device for carrying out physical or chemical reactions or both types of reactions between liquids and gases comprising a vertically disposed reaction channel provided with at least one device for feeding liquid thereto, said reaction channel having disposed therein at least one row of jalousie-like overlapping members, each member having an impact surface terminating in a trough-shaped collecting space, said trough-shaped collecting spaces being horizontally disposed in said vertical reaction channel, a gas supply inlet for introducing gas flow in an upward direction into said reaction channel disposed at the lower end thereof, a liquid feed inlet for introducing the liquid in the reaction channel in counterflow direction to the gas flow disposed at a location above at least one row of the members which have an impact surface, said impact surfaces extending transversely to the direction of flow of said gas supplied to the reaction channel, the open side of said trough-shaped collecting space facing the flow of gas and located downstream to the gas flow of an imaginary upward extension

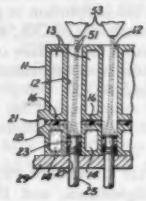
of the impact surface with the impact surface upstream from the imaginary extension, said liquid feed inlet feeding the liquid so that the gas flow contacts the liquid at said impact surface and travels therewith along said impact surface upstream of said trough-shaped collecting space and collects therewith in said trough-shaped collecting space wherein intimate reaction occurs and a liquid fog is formed, means for withdrawing liquid from the reaction channel and control means for adjusting said liquid feeding device to introduce into said reaction channel a volume of liquid greater than the volume of liquid flowing out via said trough-shaped collecting spaces, and an outlet in said reaction channel disposed at the upper end thereof for discharge of gas carrying out therewith liquid particles from said reaction channel.

4,024,209

METHOD FOR MAKING NUCLEAR FUEL RODS

Albert S. Ballard, San Diego; Roy G. Cooper, Rancho Santa Fe, and Dwight E. Davis, Escondido, all of Calif., assignors to General Atomic Company, San Diego, Calif.

Continuation-in-part of Ser. No. 404,988, Oct. 10, 1973, abandoned. This application June 10, 1975, Ser. No. 585,689
Int. Cl.² G21C 21/00
U.S. Cl. 264—.5 7 Claims



1. A method of manufacturing a nuclear rod comprising only partially filling a mold cavity with nuclear fuel particles, closing the mold cavity and reducing the volume thereof such that the fuel particles substantially fill the mold cavity, injecting a fluid solidifiable binder into the particle-filled mold cavity to fill the interstices between the fuel particles while further reducing the volume of said particle-filled mold cavity by applying pressure to the contents thereof via a movable portion of said mold cavity, and solidifying said binder in said cavity to form a fuel rod.

4,024,210

SULFUR PELLETIZING

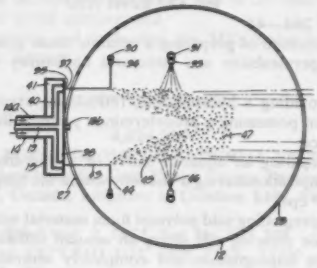
William W. Chalmers, Calgary, Canada, assignor to Canadian Occidental Petroleum, Ltd., Calgary, Canada

Division of Ser. No. 399,258, Sept. 20, 1973, Pat. No. 3,887,130. This application Mar. 17, 1975, Ser. No. 558,676
Int. Cl.² B01J 2/02
U.S. Cl. 264—11 11 Claims

1. A process for the production of solid sulfur pellets which comprises the steps of:

a. forming a stream of molten sulfur;

b. shattering said stream of molten sulfur by streams of material selected from the group consisting of steam and water intersecting said stream of molten sulfur at approximately right angles to form globules of molten sulfur; and



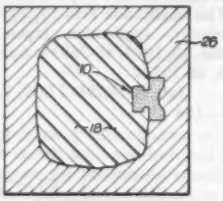
c. cooling said globules of molten sulfur wherein said globules are solidifed to sulfur pellets.

4,024,211

CASTING TECHNIQUE FOR PROSTHETIC DENTISTRY

Albert E. Strauss, Malibu, Calif., assignor to A. E. Strauss Company, Incorporated, Malibu, Calif.

Filed Oct. 14, 1975, Ser. No. 621,838
Int. Cl.² B29C 5/00
U.S. Cl. 264—16 3 Claims



1. The process of making a female attachment for a dental prosthetic device by the aid of a precision core having an anchor part and an adjoining precision male part corresponding to the female attachment to be made, and by the aid of a thermoplastic "wax" and investment material, said process comprising:

a. making a wax-up or pattern composite of wax and said core including the steps of embedding said precision male part of said core in said "wax", exposing said anchor part and sculpting the "wax" at the boundary line between said parts of said core;

b. investing the pattern with investment material including the step of surrounding said anchor part therein;

c. removing the wax by heating, leaving the core and the investment material to form a mold cavity;

d. casting a molding material in the mold cavity to form a prosthetic device having a female attachment; and

e. thereafter removing the core and the investment material by the same process, the core and the investment material having a similar degradable characteristic and materials of both said core and said investment being unaffected by said heating.

4,024,212

CERAMIC FOAM AND METHOD OF PREPARATION

James E. Dore, Ballwin, Mo.; John C. Yarwood, Madison, and Robert K. Preuss, Middletown, both of Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Continuation-in-part of Ser. No. 563,213, March 28, 1975, Pat. No. 3,962,081. This application June 23, 1975, Ser. No. 589,294

Int. Cl.² B29H 7/20

U.S. Cl. 264—44 24 Claims

1. A method of preparing a ceramic foam possessing controlled permeability and structural uniformity which comprises:

A. providing a hydrophobic, reticulated organic polymer foam possessing a predetermined permeability and resilience;

B. preparing an aqueous slurry of a thixotropic ceramic composition having a viscosity within the range $1 \times 10^3 - ^{80} \times ^{103}$ cps;

C. impregnating said polymer foam material with said slurry while shearing said slurry an amount sufficient to maximize impregnation and completely saturate said foam material;

D. expelling excess slurry from said foam material by conducting multiple rolling passes of said material through preset rollers, wherein said first pass effects a temporary compression ranging from about 50-90%, said multiple passes being conducted at the same or increased percent reduction; and

E. drying and heating said foam material to remove the organic component therefrom.

4,024,213

METHOD FOR PREPARING A POROUS STRUCTURE BY STRETCHING A RESIN SHEET USEFUL AS AN ELECTRODE SEPARATOR

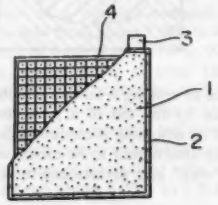
Seiichirou Honda, Kawanishi; Hiroyoshi Hata, Osaka; Yosimasa Simura, Osaka, and Soichi Une, Osaka, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 455,726, March 28, 1974, Pat. No. 3,967,978. This application Feb. 19, 1975, Ser. No. 550,907

Claims priority, application Japan, Mar. 30, 1973, 48-36930; Mar. 30, 1973, 48-36931; Apr. 5, 1973, 48-39229; Apr. 5, 1973, 48-39230

Int. Cl.² B29D 27/00, 7/24

U.S. Cl. 264—154 8 Claims



1. A process for preparing a resin sheet having a porous structure useful as an electrode separator for electric cells, which consists essentially of fabricating into a sheet a mixture consisting essentially of (a) 100 parts by weight of an olefin resin, (b) 5 to 300 parts per 100 parts by weight of the olefin resin of a finely divided inorganic substance and (c) at least one substance selected from the group consisting of (i) 3 to 100 parts by weight per 100 parts of the olefin resin of a water-swellable thermoplastic resin or (ii) 0.01 to 30 parts by weight per 100 parts by weight of the olefin resin of a water-insoluble or difficultly water-soluble hydrophilic nonionic surface active agent and stretching the resulting sheet in at least one direction to such an extent that the sheet contains fine pores arranged throughout its cross section, the diameter of said pores being 0.005 to 20 microns and 40 to 90% of the pores being open cells of which the maximum pore diameter is 0.01 to 10 microns.

4,024,214

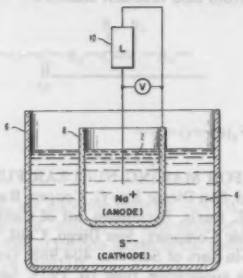
METHOD OF PREPARING β''-Al_2O_3

Luther Morris Foster, Chappaqua, and John Edward Scardefield, New Hamburg, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,314

Int. Cl.² C01F 7/04

U.S. Cl. 423—600 1 Claim



1. In the method of making β'' phase Al_2O_3, the steps of:

1. mixing θ-Al_2O_3 with a sodium containing compound sodium carbonate in the proportion to produce the compound $Na_2O6Al_2O_3$ after loss of CO_2; and

2. heating said mixture to a temperature of 950° C to 1050° C for at least two hours to obtain substantially complete conversion to β''-phase Al_2O_3.

4,024,215

PRODUCTION OF URANIUM PEROXIDE

Frank E. Caropreso, Hightstown, and Donald F. Kreuz, Princeton Junction, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Apr. 24, 1975, Ser. No. 571,089

Int. Cl.² C01G 43/00

U.S. Cl. 423—16 3 Claims

1. In the process of recovering uranium values from an aqueous uranyl solution containing dissolved vanadium and sodium including the steps of I, reacting the uranyl solution with hydrogen peroxide at a pH of 2.5 to 5.5 from about 1 to 60 minutes whereby the uranium values are precipitated as uranium peroxide; II, digesting the uranium peroxide at a pH of 3.0 to 7.0 from about 5 to 180 minutes and III, separating the digested uranium peroxide at a pH of 4.0 to 7.0 over a period of about 1 to 60 minutes, the improvement which comprises monitoring the concentration of the hydrogen peroxide in the reaction mixture and therefrom maintaining hydrogen peroxide in excess of at least 0.5 parts per part of vanadium (V_2O_5) above the stoichiometric amount required to form the uranium peroxide during steps I to III to suppress coprecipitation of vanadium.

4,024,216

CARBONATE LEACH URANIUM ORE PROCESSING WITH SODIUM POLYACRYLATE FLOCCULANT

Robert E. Finch, Naperville, Ill., and Robert H. Scala, Grand Junction, Colo., assignors to Nalco Chemical Company, Oak Brook, Ill.

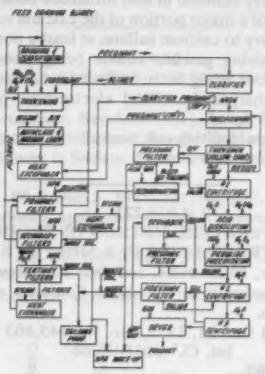
Filed July 2, 1975, Ser. No. 592,376

Int. Cl.² C01G 43/02

U.S. Cl. 423—17 4 Claims

1. In a process system where uranium values in a water

slurry of crushed uranium ore are treated by a solution of carbonate in system water to convert the uranium to a soluble uranyl tricarbonate ion, the slurry then being filtered to remove waste solids delivered to a tailings pond containing

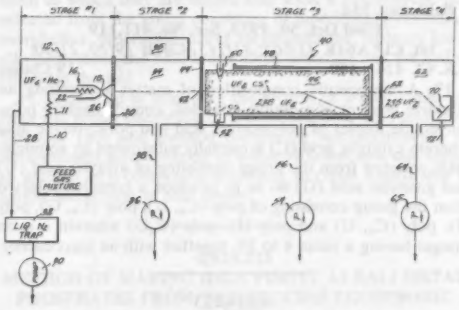


system water, and the filtrate being separately treated to precipitate uranium oxide: the improvement characterized by adding to the slurry, fed to the filter, sodium polyacrylate molecular weight 1-24 million dissolved in water obtained from the system.

4,024,217
METHOD OF ISOTOPE SEPARATION BY CHEMI-IONIZATION

Sol Wexler, Downers Grove, and Charles E. Young, Westmont, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 23, 1975, Ser. No. 580,499
Int. Cl.² B01D *59/44*; C01G *43/06*
U.S. Cl. 423—19 **10 Claims**



1. A method for separating a specific isotope from a mixture of isotopes of an actinide element present as MF_6, wherein M is the actinide element, comprising:

a. preparing a feed gas mixture of about 1 to about 10 mole percent MF_6 in a propellant gas selected from the group consisting of hydrogen and helium;

b. passing the feed gas mixture under pressure through an expansion nozzle while heating the mixture to about 600° C.;

c. releasing the heated gas mixture from the nozzle into an exhaust chamber having a reduced pressure, whereby a gas jet of MF_6 molecules, MF_6 molecular clusters and propellant gas molecules is formed, said MF_6 molecules having a translational energy of about 3 ev;

d. converting the MF_6 molecules to MF_6 ions by passing the jet through a cross jet of electron donor atoms so that an electron transfer takes place between the MF_6 molecules and the electron donor atoms whereby the jet is now quasi-neutral, containing negative MF_6^- ions and positive donor ions;

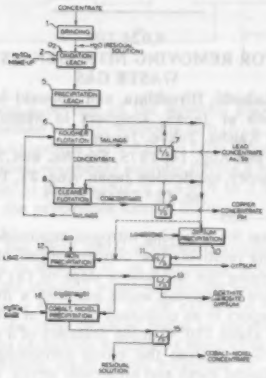
e. passing the quasi-neutral jet through a radiofrequency mass filter tuned to separate the MF_6^- ions containing the specific isotope from the MF_6^- ions of the other isotopes present in the mixture; and

f. neutralizing and collecting the MF_6 molecules of the specific isotope.

4,024,218
PROCESS FOR HYDROMETALLURGICAL UPGRADING

Donald Roderick McKay, and Ernest George Parker, both of Rossland, Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed Nov. 3, 1975, Ser. No. 628,298
Int. Cl.² C01G *3/12*, *9/08*, *51/00*, *53/00*
U.S. Cl. 423—26 **22 Claims**



19. A process for treating concentrates of sulphides of copper, zinc, nickel, cobalt, lead and iron and a particulate copper-containing matte for selectively concentrating said metal values into separate fractions which comprises the steps of: p1 a. slurrying said concentrates in an acidic solution containing in an acidic solution containing about 10 to 70 g/l sulphuric acid and about 20 to 80 g/l copper as cupric ion and subjecting the slurry to an oxidation leach at an oxygen partial pressure in the range of about 50 to 200 psi and a temperature in the range of about 70° C. to the melting point of sulphur for leaching cobalt and nickel values and for formation of leading sulphate;

b. slurrying said particulate copper-containing matte in an aqueous solution of sulphuric acid containing about 2 to 10 g/l iron as ferrous ion and subjecting the slurry to an oxidation leach at an oxygen partial pressure in the range of about 100 to 200 psi and a temperature in the range of about 100° to 115° C., said slurry having sufficient sulphuric acid to leach copper and any cobalt, nickel and zinc values, precipitate any lead as lead sulphate and provide a residual acid content of about 5 to 20 g/l, separating solids containing lead sulphate from the solution and feeding at least a portion of said solution containing copper sulphate to the oxidation leach of step (a);

c. subjecting the reaction mixture from the oxidation leach of step (a) to precipitation leach under autogenous pressure in the absence of free oxygen and at a temperature in the range of about 140° to 190° C. for precipitation of

soluble copper as insoluble simple copper sulphide and leach of iron as ferrous sulphate;

d. subjecting the reaction mixture from the precipitation leach to differential flotation for separate recovery of a lead sulphate concentrate and a copper sulphide concentrate from the solution;

e. raising the pH of the solution from the differential flotation to from about 1.5 to 2.0 by the addition of limestone whereby gypsum is precipitated and removing said gypsum from solution;

f. precipitating iron in the solution as goethite, after removal of gypsum, by maintaining in the solution about 0.5 to 1.0 g/l copper as cupric iron, adding sufficient lime to raise or to maintain the solution pH in the range of about 2.0 to 3.5, agitating the solution at a temperature in the range of about 60° to 95° C. in the presence of air and removing precipitated iron from the solution; and

g. precipitating cobalt and nickel from the solution as sulphides, after removal of precipitated iron, at a temperature in the range of about 50° C. to the solution boiling point at a pH in the range of about 1.8 to 4.5 by adding to the solution one of the group consisting of hydrogen sulphide gas, sodium sulphide and ammonium sulphide, and recovering a cobalt and nickel concentrate from residual solution.

4,024,219

PROCESS FOR REMOVING NITROGEN OXIDE FROM A WASTE GAS

Naoyuki Takahashi, Hiroshima, and Nobuaki Murakami, Nagasaki, both of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 14, 1975, Ser. No. 604,763

Claims priority, application Japan, Aug. 21, 1974, 49-94981

Int. Cl.² C01B *21/00*

U.S. Cl. 423—235 **6 Claims**

1. A process for removing nitrogen monoxide from a waste gas containing relatively low concentrations of said nitrogen oxide comprising the successive steps of (a) contacting the nitrogen oxide containing waste gas with a molar excess of nitric acid vapors in an oxidation column at a temperature of about 50° to about 150° C in the presence of a porous adsorbing agent selected from the group consisting of silica gel, alumina, colloidal earth and molecular sieves, thereby oxidizing the nitrogen oxide to nitrogen dioxide, (b) contacting the thus treated waste gas with a countercurrent of water to remove the excess nitric acid therefrom while the nitrogen dioxide remains in the waste gas, (c) contacting the nitrogen dioxide-containing waste gas with an aqueous alkaline solution to absorb and remove the nitrogen dioxide contained therein, and (d) discharging the thus treated waste gas substantially freed of nitrogen dioxide into the atmosphere.

4,024,220

FLUE GAS SCRUBBING AND CONVERSION OF CALCIUM SULFITE TO CALCIUM SULFATE

Norman Ostroff, Stamford, and Nurhan E. Takvoryan, Norwalk, both of Conn., assignors to UOP Inc., Des Plaines, Ill.

Filed Aug. 25, 1975, Ser. No. 607,310

Int. Cl.² C01B *17/00*; C01F *11/46*, *1/00*

U.S. Cl. 423—242 **2 Claims**

1. A method for effecting the calcium slurry scrubbing and desulfurizing of a sulfur-containing flue gas stream in a manner to minimize the bulk of resulting calcium-sulfur compounds, which comprises the steps of:

a. substantially removing extrained particulates from the flue gas stream by an electrostatic preciptator means,

b. passing the resulting stream to a scrubbing zone and effecting the contacting thereof with an aqueous slurry containing a calcium source,

c. discharging a resulting scrubbed flue gas stream with reduced sulfur content from said scrubbing zone,

d. also withdrawing from said scrubbing zone at least a part of the bottom slurry containing resulting calcium sulfite, combining an acid with said bottoms slurry to provide a low pH for said slurry, and passing such clacium sulfite-containing slurry to a separate ozonation zone,

e. passing an ozone-containing gaseous stream into contact with the slurry material in said ozonation zone to effect a conversion of a major portion of the calcium sulfite in the bottoms slurry to calcium sulfate, at least a portion of the ozone-containing gaseous stream being passed to said ozonation zone being received from an ozone-containing stream discharged from said electrostatic precipitator means, and

f. withdrawing a resulting calcium sulfate-containing sludge from said ozonation zone.

4,024,221

LOW TEMPERATURE METHOD OF PRODUCING BORON TRICHLORIDE IN A MOLTEN BATH

Aaron J. Becker, Monroeville, and Don R. Careatti, Apollo, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 31, 1975, Ser. No. 645,803

Int. Cl.² C01B *35/06*

U.S. Cl. 423—292 **8 Claims**

1. A method of producing boron trichloride comprising:

a. reacting a source of boron oxide and a reducto-chlorinating agent in a molten bath containing a combination of metal chlorides wherein at least a first metal chloride of the combination is selected from the group consisting of alkali and alkline earth metal chlorides and a second metal chloride is selected from the group consisting of aluminum, iron, copper, zinc, magnesium, lead and tin chloride, the combination having a melting point of not more than 600° C; and

b. recovering the boron trichloride by vaporization from the bath.

4,024,222

NUCLEIC ACID COMPLEXES

Paul O. P. Ts'o, Timonium, Md., and William A. Carter, Buffalo, N.Y., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Oct. 30, 1973, Ser. No. 411,119

Int. Cl.² A61K *31/665*, *31/715*; C07H *19/10*, *21/00*

U.S. Cl. 424—180 **19 Claims**

19. A therapeutic composition of matter comprising an effective amount of a double-stranded, complementary polynucleotide duplex of polyinosinic acid and polycytidylic acid wherein cytidylic acid (C) is partially substituted by an nucleotide selected from the group consisting of uridylic acid (U) and guanylic acid (G) so as to produce a complex selected from the group consisting of poly (C_n, U), poly (C_n, G), poly (I). poly (C_n, U) and poly (I). poly (C_nG) wherein n is an integer having a value 4 to 29, together with an inert carrier.

4,024,223

STRIPE COMPOSITION AND METHOD OF REDUCING SMELL ASSOCIATED THEREWITH

Kanji Noda, Chikushino; Kazuki Furuya; Satoru Miyata, both of Tosu, and Toyoaki Yoneda, Fuchu, all of Japan, assignors to Teijin Limited, Osaka and Hisamitsu Pharmaceutical Co., Inc., Saga, both of, Japan

Continuation of Ser. No. 413,253, Nov. 6, 1973, abandoned.

This application Apr. 22, 1975, Ser. No. 570,429

Claims priority, application Japan, Nov. 11, 1972, 47-112593

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **2 Claims**

1. A method for reducing the discomfortable or stinging smell of a stupe composition and improving a wet packing effect of the same which comprises mixing 10 to 95% by weight, based on the weight of the composition, of an inclu-

sion compound selected from the group consisting of an inclusion compound of menthol and β-cyclodextrin and an inclusion compound of methyl salicylate and β-cyclodextrin with a stupe base selected from the group consisting of kaoline, bentonite, talc, wax, sodium lactate, zinc oxide, boric acid, and aluminum silicate.

4,024,224
14-AMINODAUNOMYCINS, THEIR PREPARATION AND USE

Federico Arcamone, Nerviano (MI); Luigi Bernardi, Milan; Bianca Patelli, Milan, and Aurelio di Marco, Milan, all of Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

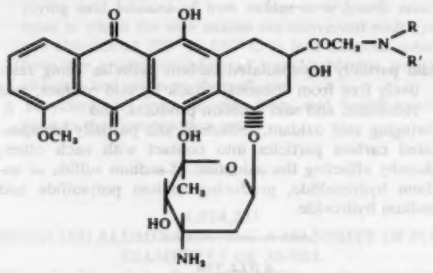
Filed Dec. 3, 1975, Ser. No. 637,170

Claims priority, application United Kingdom, Dec. 24, 1974, 55796/74

Int. Cl.² C07H *15/22*; A61K *31/71*

U.S. Cl. 424—180 **12 Claims**

1. A daunomycin derivative of the formula:



I

wherein R and R′ are independently selected from the group consisting of hydrogen, lower alkyl, hydroxy lower alkyl, dichloro lower alkyl, amino lower alkyl and (lower alkyl amino)-lower alkyl, with the proviso that R and R′ are not both hydrogen, and wherein R and R′ together with the nitrogen atom to which they are bound may form a heterocyclic ring selected from the group consisting of piperidine, pyrrolidine, morpholine, piperazine, lower alkylpiperazine, hydroxy lower alkylpiperazine and halo lower alkylpiperazine and the hydrochlorides thereof.

11. A method of inhibiting the growth of a tumor selected from the group consisting of ascites Sarcoma 180, and solid Sarcoma 180, said method comprising intraperitoneally or intravenously administering to a host afflicted with said tumor an amount of a compound according to claim 1 sufficient to inhibit the growth of said tumor.

4,024,225
METHOD OF MAKING HIGH PURITY ALKALI METAL PHOSPHATES FROM WET-PROCESS PHOSPHORIC ACID

Peter T. Chiang, Monroeville, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 412,077, Nov. 2, 1973, abandoned. This application July 28, 1975, Ser. No. 599,432

Int. Cl.² C01B *15/16*

U.S. Cl. 423—305 **8 Claims**

1. Method of preparing high-purity alkali-metal phosphate comprising:

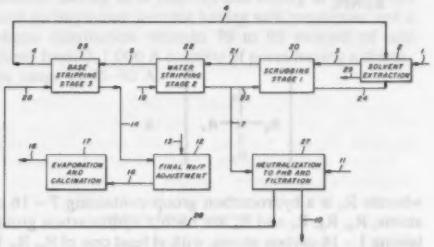
a. extracting a portion of the P_2O_5 in a wet-process phosphoric acid containing 40 – 58% P_2O_5 with an essentially water-immiscible alcohol selected from the group consisting of n-hexanol, n-heptanol, n-octanol, iso-octanol and mixtures thereof in an amount from about one-half to about four parts by weight for each part by weight of wet-process phosphoric acid,

b. recovering P_2O_5 in a stripping process comprising the steps of

i. scrubbing the P_2O_5-loaded alcohol extract with a portion of the aqueous phosphoric acid solution from water stripping step (b) ii,

ii. thereafter stripping the P_2O_5-loaded alcohol extract from the scrubbing step with water to form an aqueous phosphoric acid solution, and

iii. thereafter stripping the P_2O_5-loaded alcohol from the water stripping step (b) ii, with an alkali metal phosphate solution having a molar ratio of alkali metal to phosphorus of from 1.3 to 1 to 3.0 to 1, to form a product solution of alkali metal phosphate having a molar ratio of alakli metal to phosphate of from 1:1 to 1.67:1,



c. neutralizing a portion of the aqueous phosphoric acid solution formed in water stripping step (b) ii, with sodium hydroxide or sodium carbonate to form a precipitate and an alkali metal phosphate solution having a molar ratio of alkali metal to phosphorus of 1.3 to 1 to 3 to 1,

d. removing the precipitate formed during neutralizing step (c),

e. recycling the alkali metal phosphate solution from step (c) for use in step (b) iii. as a stripping solution,

f. recycling the stripped water-immiscible alcohol from the base stripping step (b) iii. to the extraction step (a), and

g. adjusting the ratio of alkali metal to phosphorus in the alkali metal phosphate solution of step (b) iii. to a desired ratio by adding alkali metal hydroxide or alkali metal carbonate thereto.

4,024,226
METHOD OF MANUFACTURING A POROUS CARBON BODY

Bernhard Lersmacher; Siegfried Nerche, and Karlheinz Schelhas, all of Aachen, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,300

Claims priority, application Germany, Nov. 9, 1974, 2453204

Int. Cl.² C01B *31/02*

U.S. Cl. 423—449 **6 Claims**

1. In the method of forming a porous carbon body wherein a foamed polyurethane body is first impregnated with a resin convertable to vitreous carbon upon heating and the resultant impregnated foamed body is first heated to drying, further heated to a temperature sufficiently high to harden the body and then heated to a temperature sufficiently high to cause the resultant impregnated polyurethane foamed body to be carbonized, the improvement wherein prior to the step of impregnation the foamed polyurethane body is soaked with a liquid epoxide resin or an aqueous polyvinyl alcohol solution.

4,024,227
PROCESS FOR PRODUCING CARBON FIBERS HAVING EXCELLENT PROPERTIES

Soichiro Kishimoto, and Saburo Okazaki, both of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed Oct. 30, 1975, Ser. No. 627,469
Claims priority, application Japan, Nov. 7, 1974, 49-128679
Int. Cl.² C01B 31/07
U.S. Cl. 423—447.4 12 Claims

1. A process for producing a carbon fiber which comprises (a) impregnating a water-swollen acrylonitrile fiber containing at least 85 mol % acrylonitrile with 0.05 – 5%, based on the dry weight of the fiber, of at least one compound represented by the following general formula (I) or (II):

$$R_1\text{-}NH_2 \qquad (I)$$

$$\left[\begin{array}{c} R_3 \\ | \\ R_2\text{—}N\text{—}R_4 \\ | \\ R_5 \end{array}\right]^{+} \cdot X^{-} \qquad (II)$$

wherein R_1 is a hydrocarbon group containing 7 – 16 carbon atoms; R_2, R_3, R_4 and R_5 are each a hydrocarbon group containing 1 – 16 carbon atoms, with at least one of R_2, R_3, R_4 and R_5 being a hydrocarbon group containing 7 – 16 carbon atoms; and X is a monovalent anion; (b) heat treating the fiber at a temperature of at least 150° C. for 0.1 second to 30 minutes so as to render the fiber to have 20 – 80 weight percent undissolved matter upon being immersed in a 60% aqueous sodium thiocyanate solution at 80° C. for 20 minutes; (c) thermally stabilizing the fiber by heating under tension in an oxidizing atmosphere at a temperature of from 150° C. to 400° C. and thereafter (d) carbonizing or carbonizing and then graphitizing under tension in a non-oxidizing atmosphere at a temperature above 800° C.

4,024,228
PROCESS FOR THE PREPARATION OF ANHYDROUS GOLD TRICHLORIDE

Daniela Belli Dell'Amico, Carrara, and Fausto Calderazzo, Ghezzano, both of Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed Mar. 4, 1974, Ser. No. 447,644
Int. Cl.² C01G 7/00; C01B 7/08, 17/48
U.S. Cl. 423—491 2 Claims

1. Process for the preparation of anhydrous gold trichloride consisting in reacting tetrachloro-auric acid with thionyl chloride by stirring a suspension in thionyl chloride of finely divided tetrachloro-auric acid having the formula $HAuCl_4.3H_2O$ at a temperature in the range from 20° to 65° C, and then recovering said anhydrous gold trichloride from the reaction mixture.

4,024,229
PRODUCTION OF POLYSULFIDE WITH PTFE COATED CATALYST

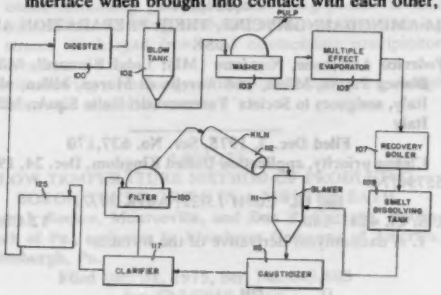
Glen C. Smith, and Frederick W. Sanders, both of Chillicothe, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 87,504, Nov. 6, 1970, abandoned. This application May 9, 1974, Ser. No. 468,471
Int. Cl.² C01B 17/34, 17/42
U.S. Cl. 423—562 7 Claims

1. In a process for production of sodium polysulfide and sodium hydroxide from sodium sulfide or sodium hydrosulfide, wherein said sodium polysulfide and sodium hydroxide is used in the treatment of lignocellulose material, the steps consisting essentially of:

1. providing a gaseous oxidant, an aqueous reductant containing sodium sulfide or sodium hydrosulfide, and particulate activated carbon, having a particle size of between 9 millimicrons and one inch and having a surface area of from 3 square meters per gram to in excess of 950 square meters per gram (BET), and which has been partially encapsulated with 0.1 – 100% by weight of carbon of a polytetrafluoroethylene resin,

said oxidant and reductant being capable of forming an interface when brought into contact with each other,



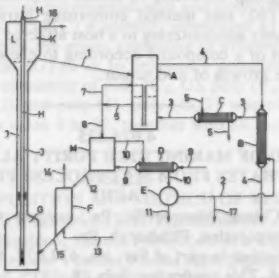
said partially encapsulated carbon particles being relatively free from chemical attack by said oxidant, said reductant, and said reaction products, and

2. bringing said oxidant, reductant and partially encapsulated carbon particles into contact with each other, thereby effecting the oxidation of sodium sulfide or sodium hydrosulfide, producing sodium polysulfide and sodium hydroxide.

4,024,230
PRODUCING HYDROGEN AND OXYGEN BY DECOMPOSITION OF WATER VIA THE THERMOCHEMICAL IRON-CHLORINE SYSTEM

Karl-Friedrich Knoche, Kersten Pavillon Lousberg; Helmut Cremer, Boxgraben 79, and Gerhard Steinborn, Roermonder Str. 309, all of 51 Aachen, Germany

Filed Sept. 12, 1975, Ser. No. 613,000
Claims priority, application Germany, Sept. 14, 1974, 2443993; Sept. 14, 1974, 2444061
Int. Cl.² C01B 13/00, 1/08
U.S. Cl. 423—579 8 Claims



1. A method for obtaining hydrogen by decomposing water in a thermochemical process employing adjuvants selected from the group consisting of inorganic iron compounds, chlorine and hydrogen chloride comprising the steps of:

a. reducing iron chloride selected from the group consisting of iron(II)chloride, iron(III)chloride and mixtures thereof at a temperature of about 525° to 1300° C in a first reaction zone with hydrogen to iron;

b. supplying the iron to a second reaction zone and then converting it to Fe_3O_4 by reaction with steam heated to

above 225° C, wherein the heat energy of the effluent gases containing hydrogen from the two reaction zones may be employed for heating reactants selected from the group consisting of hydrogen and steam in other reaction zones;

c. separating the hydrogen, after the use of the heat, from the effluent gases of the two reaction zones and removing the part of the hydrogen not employed for the reduction of the iron chloride in the first reaction zone as an end product;

d. withdrawing the hot Fe_3O_4 at approximately 900° to 1100° C from the second reaction zone and supplying it as a heat carrier to a third reaction zone in which it provides the heat required for the conversion carried out therein at a temperature range of about 225° to 1100° C of water and iron(II/III)oxide with chlorine accompanied by the evolution of oxygen;

e. separating the oxygen from the cooled effluent gas from the third reaction zone and removing said oxygen as an end product;

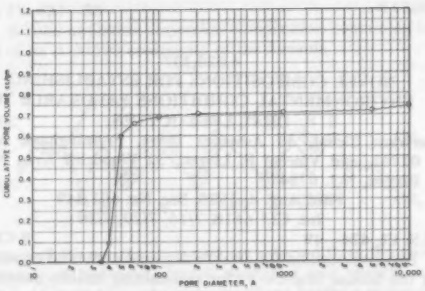
f. withdrawing the approximately 400° to 800° C hot mixture of iron oxides from the third reaction zone and supplying said mixture of iron oxides to a fourth reaction zone in which the iron oxides are converted with hydrogen chloride at 200° to 850° C to iron chloride selected from the group consisting of iron(II)chloride iron(III)-chloride and mixtures thereof; and

g. recycling said iron chloride from said fourth reaction zone to the first reaction zone.

4,024,231
PRODUCING ALUMINA HAVING A MAJORITY OF PORE DIAMETERS OF 35-80A

William C. Ziegenhain, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 279,608, Aug. 10, 1972, abandoned. This application Sept. 5, 1974, Ser. No. 503,219
Int. Cl.² C01F 7/02
U.S. Cl. 423—628 **6 Claims**



1. In a method for producing alumina having the properties: a surface area from about 250 to about 500 m^2/g, a loose bulk density from about 10 to about 30 lb/ft^3, a pore volume of 0–10,000 A from about 0.6 to about 2.5 cc/g and a pore volume from 0–1,000 A of at least 0.6 cc/g, said method consisting essentially of:

a. hydrolyzing aluminum alkoxides, wherein the alkoxy groups contain an average of from 4 to 20 carbon atoms each, with water to produce an aqueous alumina slurry and alcohols containing from 4 to 20 carbon atoms;

b. separating said aqueous alumina slurry from said alcohols;

c. mixing said aqueous alumina slurry with an organic solvent selected from the group consisting of methanol, ethanol, propanol, isopropanol, butanol, isobutanol, and tertiary butanol in an amount sufficient to produce said alumina having said properties upon drying; and,

d. drying to produce alumina having said properties, the improvement comprising:

e. reacting said aluminum alkoxides of (a) wherein the alkoxy groups contain from 4 to 20 carbon atoms each, with a stoichiometric excess of methanol to form aluminum methoxide and alcohols containing from 4 to 20 carbon atoms;

f. separating said aluminum methoxide and said alcohols;

g. reacting said aluminum methoxide with a stoichiometric excess of water to form alumina and methanol;

h. separating said alumina containing a minor portion of said methanol and water from a major portion of said methanol and water;

and thereafter mixing as in step (c) and drying as in step (d) to produce an improved alumina having said properties and a pore volume distribution wherein 70 to 95 percent of said pore volume from 0–1,000 A consists of pores having a diameter in the range of 35–80 A.

4,024,232
METHOD OF PREPARING MAGNETITE HAVING A CONTROLLED PARTICLE SIZE, STARTING FROM FERROUS SULPHATE SOLUTIONS

Angelo Garberi, Cilavegna (Pavia); Agostino Geddo, Trecate (Novara); Gian Lorenzo Marziano, and Bruno Viviani, both of Novara, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Feb. 24, 1975, Ser. No. 552,341
Claims priority, application Italy, Feb. 25, 1974, 48633/74
Int. Cl.² C01G 49/02
U.S. Cl. 423—632 **2 Claims**

1. In a process for preparing equiaxial magnetite starting from a ferrous sulphate solution comprising

a first step in which ⅔ of the Fe^{++} ion is precipitated as $Fe(OH)_2$ with an alkali at a temperature ranging from 15° to 40° C, said $Fe(OH)_2$ being oxidized to alpha-FeO(OH), and

a second step, in which the remaining Fe^{++} is precipitated as $Fe(OH)_2$ with an alkali and the slurry is heated to a temperature ranging from 70° to 100° C, thus obtaining equixial magnetite;

the improvement characterized in that in the aforesaid second step, before the heating of the slurry, gamma-FeO(OH) is added in such an amount that the Fe of the gamma-FeO(OH) is 0.1–10% of the Fe^{++} initially present in the solution, the higher the percentage of gamma-FeO(OH), the lower the average diameter of the resulting magnetite.

2. In a process for preparing equiaxial magnetite starting from a ferrous sulphate solution, in which, at a temperature ranging from 15° to 40° C, the Fe^{++} present in solution is precipitated with an alkali in the form of $Fe(OH)_2$, then the slurry is heated to a temperature ranging from 70° to 100° C and the ferrous hydroxide is oxidized with air to magnetite;

the improvement characterized in that after heating and before oxidation, gamma-FeO(OH) is added in such an amount that the Fe of the gamma-FeO(OH) is 0.1–10% of the Fe^{++} initially present in the solution, the higher the percentage of gamma FeO(OH), the lower the average diameter of the resulting magnetite.

4,024,233

99m-TECHNETIUM LABELED MACROAGGREGATED HUMAN SERUM ALBUMIN PHARMACEUTICAL

Harry S. Winchell, Lafayette; Morton Barak, and Parmer Van Fleet, III, both of Walnut Creek, all of Calif., assignors to Medi-Physics, Inc., Emeryville, Calif.

Continuation-in-part of Ser. No. 259,679, June 5, 1972, abandoned. This application July 24, 1974, Ser. No. 491,204

Int. Cl.² A61K *29/00, 43/00*

U.S. Cl. 424—1 3 Claims

1. A stable reagent suitable for the preparation of a 99m-technetium labeled pharmaceutical for scintigraphic organ imaging by the addition of a solution of 99m-technetium pertechnetate comprising an aqueous suspension of macroaggregated human serum albumin sized for such imaging having distributed throughout particles of colloidal stannous tin, said particles of colloidal stannous tin being entrapped throughout each particle of said macroaggregates.

4,024,234

ORGAN VISUALIZATION

Reginald Monks; Anthony Leonard Mark Riley, and Gavin Murray Cree, all of Amersham, England, assignors to The Radiochemical Centre Limited, England

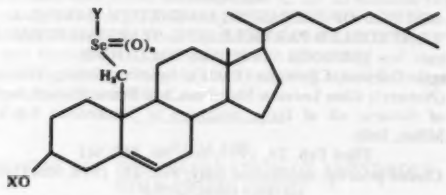
Filed Feb. 19, 1975, Ser. No. 550,909

Claims priority, application United Kingdom, Feb. 20, 1974, 7808/74

Int. Cl.² A61K *43/00;* A61N *5/12*

U.S. Cl. 424—1 7 Claims

1. A selenium derivative of cholesterol having the general formula



(I)

where X is hydrogen or acyl,

y is alkyl, and

n is 0 or 1.

7. A method of visualizing the adrenal glands of a mammal, which method comprises introducing into the live mammal a ^{75}Se derivative of choloesterol as claimed in claim 1, allowing the labelled steroid to concentrate in the adrenal glands, and observing the radiation emitted by the labelled steroid in the said adrenal glands.

4,024,235

DETECTION AND QUANTITATION OF VIRAL ANTIBODIES

Howard H. Weetall, Big Flats, and Sidney Yaverbaum, Sufferin, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed July 21, 1975, Ser. No. 597,837

Int. Cl.² A61K *39/12, 43/00;* G01N *31/22, 33/16*

U.S. Cl. 424—1 8 Claims

1. A method of detecting or quantitating anti-virus antibodies in a test solution which comprises the steps of:

a. reacting the test solution containing an unknown amount of the viral antibodies, a known amount of the antibodies which have been radioactively labelled, and a composite consisting of the anti-virus antibodies coupled chemically through an intermediate silane coupling agent to a porous glass body, the composite antibodies having complexed thereto quantities of the virus with which the unknown antibodies and the labelled antibodies can complex;

b. separating the composite from the reaction solution;

c. determining the radioactivity count of either the separated composite or the remaining solution; and

d. relating the count to a standard to detect or quantitate the viral antibodies in the serum.

4,024,236

ANTHELMINTIC COMPOSITIONS AND USES EMPLOYING AMIDOPHENYLISOTHIOUREAS

Arno Widdig, Blecher; Engelbert Kühle, Berg. Gladbach; Herbert Thomas, and Hans Peter Schulz, both of Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

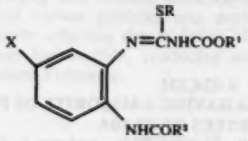
Division of Ser. No. 409,165, Oct. 24, 1973, abandoned. This application May 19, 1975, Ser. No. 578,742

Claims priority, application Germany, Oct. 27, 1972, 2252691

Int. Cl.² A01N *9/12, 9/20, 9/28*

U.S. Cl. 424—300 8 Claims

1. A method of treating helmintic infections in humans and other animals which comprises orally administering to such human or animal an anthelmintically effective amount of a compound of the formula:



wherein X is alkyl of 1 to 4 carbon atoms;

R is alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 4 carbon atoms, cyclohexyl or benzyl;

R^1 is alkyl of 1 to 4 carbon atoms; and

R^2 is alkyl of 1 to 4 carbon atoms, cyclopentyl, cyclohexyl, phenyl, benzyl or phenoxymethyl.

4,024,237

NOVEL COMPOSITIONS FOR ESTABLISHING ENVIRONMENTAL CONDITIONS FAVORABLE TO ORAL LEUCOCYTES

Bertram Eichel, 30 Ashmont Drive, Framingham, Mass. 01701, and Vincent F. Lisanti, 32 Woodcliff Ave., North Bergen, N.J. 07047

Filed Aug. 4, 1975, Ser. No. 601,849

Int. Cl.² A61K *7/16, 7/20, 7/24*

U.S. Cl. 424—49 9 Claims

1. A composition for establishing environmental conditions in the human oral cavity for maintaining healthy functional oral leucocytes, said composition comprising a non-toxic mixture of effective amounts of: (1) at least one compound selected from the group consisting of dextran, cellulose ethers, polyvinylpyrrolidone and gelatin for maintaining a colloidal and viscous environment within the oral cavity which favors and promotes oral leucocyte locomotion, phagocytosis and bacterial kill; (2) at least one compound selected from the group consisting of carbohydrates, fats and proteins to provide a source of energy for said oral leucocytes; (3) an inorganic salt providing and maintaining a balanced ionic environment which favors and promotes locomotion, phagocytosis and bacterial kill; and (4) at least one compound selected from the group consisting of phosphate buffers, carbon dioxide-bicarbonate buffers, tris buffers and glycylglycine buffers for maintaining substantially a physiological pH to promote leucocyte functions while avoiding other tissue and cell injury.

4,024,238

ORAL HYGIENE METHOD

William H. Riley, Midland, and Herman J. Hendricks, Freeland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 17, 1976, Ser. No. 686,754
Int. Cl.² A61K 7/16
U.S. Cl. 424—51 3 Claims

1. A method for inhibiting plaque formation in the mouth of a mammal which comprises periodically contacting the oral cavity inclusive of the teeth with a concentration of between 0.1 and 0.3 weight percent of a 4-chlorophenyl-2-thienyliodonium salt in a pharmaceutically-acceptable vehicle for a time ranging between about thirty seconds and about five minutes.

4,024,239

TOOTHPASTE COMPOSITION

Morton Pader, West Englewood, N.J., assignor to Lever Brothers Company, New York, N.Y.

Filed July 3, 1975, Ser. No. 593,080
Int. Cl.² A61K 7/16
U.S. Cl. 424—57 5 Claims

1. A toothpaste composition for incorporation into an uncoated aluminum tube that provides an improved luster to tooth enamel comprising

a. from 10% to 30% of alpha alumina trihydrate having an average particle size of from about 6.5 to about 8.5 microns;

b. from 10% to 20% of a precipitated amorphous silica having a low abrasive capacity; and

c. a stabilizing agent of about 1 to 5% dicalcium phosphate dihydrate or about 0.5 to 2% anhydrous dicalcium phosphate;

said stabilizing agents being effective to stabilize components (a) and (b) against corrosion of uncoated aluminum tubes.

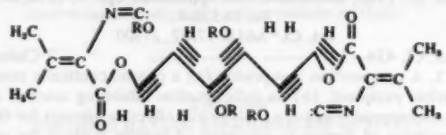
4,024,240

ANTIBIOTIC A-32390 COMPOSITIONS

Arvind L. Thakkar, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed July 18, 1975, Ser. No. 597,115
Int. Cl.² A61K 31/79, 31/275
U.S. Cl. 424—80 4 Claims

1. A solid antibiotic dispersion composition containing one part of an A-32390 compound of the formula



wherein all R's are the same and are selected from the group consisting of hydrogen, acetyl, propionyl and butyryl; and from 1–15 parts of a polyvinylpyrrolidone having a molecular weight in the range 10,000–360,000.

4,024,241

NUCLEASE-RESISTANT HYDROPHILIC COMPLEX OF POLYRIBOINOSINIC-POLYRIBOCYTIDYLIC ACID

Hilton B. Levy, Bethesda, Md., assignor to The United States of America as represented by the Secretary of Health, Education and Welfare, Washington, D.C.

Continuation-in-part of Ser. No. 509,966, Sept. 27, 1974, Pat. No. 3,952,097. This application Sept. 4, 1975, Ser. No. 610,457
Int. Cl.² A61K 37/00, 45/02, 45/04
U.S. Cl. 424—85 15 Claims

1. A nuclease-resistant hydrophilic complex of relatively high molecular weight polyriboinosinic-polyribocytidylic acid, relatively low molecular weight poly-l-lysine and carboxymethylcellulose.

11. A method of inducing the synthesis of interferon in a primate which comprises administering to a primate host a nuclease-resistant hydrophilic complex of relatively high molecular weight polyriboinosinic-polyribocytidylic acid, relatively low molecular weight poly-l-lysine and carboxymethylcellulose in a dose sufficient to provide an interferon-inducing amount of said polyriboinosinic-polyribocytidylic acid.

4,024,242

SUBSTANCE HAVING IMMUNOLOGICAL ACTIVITY AND PROCESS FOR ITS MANUFACTURE

Klaus-Dieter Hungerer, Marburg-Marbach, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 23, 1975, Ser. No. 589,082
Claims priority, application Germany, June 25, 1974, 2430380
Int. Cl.² A61K 39/00; C12B 1/00
U.S. Cl. 424—88 11 Claims

1. A process for the manufacture of a substance having immunological activity, which comprises incubating trypanosomes that have been suspended in a mono-phase, aqueous, liquid culture medium with a phenanthridine derivative until they lose their pathogenicity, and then collecting the trypanosomes thus attenuated.

11. A vaccine effective against the Chagas disease, containing attenuated trypanosomes as claimed in claim 10 as the active ingredient.

4,024,243

PROCESS FOR ISOLATING HEPATITIS B ANTIGEN

William J. McAleer, Ambler, and Edward H. Wasmuth, Telford, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed June 16, 1975, Ser. No. 587,507
Int. Cl.² A61K 39/12; C12K 5/00; C07G 7/00
U.S. Cl. 424—89 4 Claims

1. In a process for concentrating HB_sAg from clarified plasma of human hepatitis B donors, the improvement comprising subjecting the clarified plasma to isopycnic banding in sodium bromide density gradient and recovering a fraction rich in HB_sAg.

4,024,244

AMOXICILLIN DERIVATIVES

Dennis Anthony Love, Redhill, England, assignor to Beecham Group Limited, England

Division of Ser. No. 611,199, Sept. 8, 1975, Pat. No. 3,980,639. This application Mar. 5, 1976, Ser. No. 664,083
Claims priority, application United Kingdom, Sept. 18, 1974, 40661/74
Int. Cl.² A61K 35/00
U.S. Cl. 424—114 2 Claims

1. An antibacterial mixture which comprises D-α-carboxyamino-p-hydroxybenzyl penicillin disodium salt and sodium amoxycillin wherein the ratio of the sodium amoxycillin to the D-α-carboxyamino-p-hydroxybenzylpenicillin disodium salt is between 2:1 and 1:2.

4,024,245

ANTIBIOTIC A-30912 AND PROCESS FOR PRODUCTION THEREOF

Marvin M. Hoehn, and Karl H. Michel, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 619,107, Oct. 2, 1975, abandoned. This application Aug. 25, 1976, Ser. No. 717,738

Int. Cl.[2] A61K *35/74*

U.S. Cl. 424—119 9 Claims

1. Antibiotic A-30912 factor D which is a white amorphous solid; which is soluble in methanol, ethanol, dimethylformamide, dimethyl sulfoxide, or ethyl acetate and in aqueous solutions having a pH greater than 7.0; but which is insoluble in diethyl ether or petroleum ether; and which has:

a. an approximate molecular weight of 1100;

b. an approximate elemental composition of 56.37 percent carbon, 8.17 percent hydrogen, 8.54 percent nitrogen, and 26.92 percent oxygen (by difference);

c. the following specific rotation:

$[\alpha]_D^{25} - 50°$ (c 0.34, CH_3OH);

d. an infrared absorption spectrum in KBr disc with the following observable characteristic absorption maxima: 2.98 (strong), 3.31 (weak), 3.36 (shoulder), 3.40 (medium), 3.48 (weak), 5.76 (weak), 6.01 (strong), 6.10 (shoulder), 6.49 (medium), 6.57 (medium), 6.90 (medium), 7.81 (weak), 8.07 (weak), and 9.16 (weak) microns;

e. ultraviolet absorption spectra in both neutral and acidic methanol with absorption maxima at 225 nm (ε 18,000) and 275 nm (ε 2,500) and in basic methanol with absorption maxima at 240 nm (ε 11,000) and 290 nm (ε 3,000);

f. an amino-acid analysis, after hydrolysis, which indicates the presence of threonine, hydroxyproline, histidine, and three other as-yet-unidentified amino acids; and

g. an R_f value of 0.59 on silica-gel thin-layer chromatography using a benzene: methanol (7:3) solvent system and *Candida albicans* bioautography for detection.

4,024,246

ANTIBIOTIC A-22082 AND PROCESS FOR PRODUCTION THEREOF

Calvin E. Higgens, and Karl H. Michel, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 619,108, Oct. 2, 1975, abandoned. This application Aug. 25, 1976, Ser. No. 717,739

Int. Cl.[2] A61K *35/74*

U.S. Cl. 424—119 3 Claims

1. Antibiotic A-22082 which is a white amorphous solid; which is soluble in methanol, ethanol, dimethylformamide, dimethyl sulfoxide, ethyl acetate or in aqueous solutions having a pH greater than 7.0; but which is insoluble in diethyl ether or petroleum ether; and which has:

a. an approximate molecular weight of 1100, as determined by mass spectrometry and titration;

b. an approximate elemental composition of 56.52 percent carbon; 7.29 percent hydrogen, 8.68 percent nitrogen, and 27.09 percent oxygen;

c. an approximate empirical formula of $C_{51-53}H_{79-83}N_7O_{17-19}$;

d. the following specific rotations:

$[\alpha]_D^{25}$ −44° (c0.5, CH_3OH)

$[\alpha]_{365}^{25}$ −156° (c0.5, CH_3OH)

e. an infrared absorption spectrum in KBr disc with the following observable characteristic absorption maxima: 2.97 (strong), 3.30 (weak); 3.36 (shoulder), 3.39 (medium), 3.47 (weak), 5.97 (strong), 6.06 (strong), 6.45 (medium), 6.53 (medium), 6.83 (medium), 7.78 (weak), 8.00 (weak), 9.07 (weak) and 11.66 (weak) microns;

f. ultraviolet absorption spectra in both neutral and acidic methanol with absorption maxima at 225 nm (ε 18,000), 275 nm (ε 3,000) and 284 nm (shoulder ε 2,500) and absorption maxima in basic methanol at 245 nm (ε 16,000) and 290 nm (ε 3,000);

g. a ^{13}C nuclear magnetic resonance spectrum in perdeuteromethanol with the following characteristics: δ 176.1, 174.3, 173.4, 172.7, 172.4, 169.8, 158.4, 132.8, 130.9, 129.6, 129.0, 116.2, 77.0, 75.7, 74.4, 71.3, 70.9, 69.6, 68.3, 62.4, 58.7, 56.9, 56.1, 52.9, 39.0, 38.5, 36.8, 35.2, 33.9, 32.9, 32.6, 30.7, 30.4, 30.2, 28.2, 27.0, 26.5, 23.6, 20.1, 19.6, 14.4, and 11.3 ppm;

h. a titratable group with a pK_a value of 12.7 in 66% aqueous dimethylformamide;

i. after hydrolysis, an amino-acid analysis which indicates the presence of threonine, hydroxyproline, and three other as-yet-unidentified amino acids;

j. an R_f value of 0.35 on silica-gel thin-layer chromatography using a benzene:methanol (7:3) solvent system and *Candida albicans* bioautography for detection;

k. the following R_f values in the paper chromatographic systems indicated below, using *Candida albicans* bioautography for detection:

R_f Value	Solvent System
0.76	Butanol saturated with water
0.69	Butanol saturated with water plus 2% p-toluenesulfonic acid
0.75	Methanol:0.1 N HCl (3:1)
0.17	Butanol:ethanol:water (13.5:15:150)
0.78	Methanol:0.05 M sodium citrate at pH 5.7 (7:3); paper buffered with 0.05 M sodium citrate at pH 5.7

4,024,247

COMPOSITION AND METHOD OF USING A PROTEIN MIXTURE DERIVED FROM LIVER

Jack G. Fortini, Oakland; Walter A. Blair, Palo Alto, and Gerold M. Grodsky, San Francisco, all of Calif., assignors to Palolab Pharmaceuticals Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 212,741, Dec. 27, 1971, Pat. No. 3,876,774, which is a division of Ser. No. 212,341, Dec. 27, 1971, Pat. No. 3,701,768, which is a continuation-in-part of Ser. No. 763,292, Sept. 27, 1968, abandoned, which is a continuation-in-part of Ser. No. 307,404, Sept. 9, 1963, abandoned, which is a continuation-in-part of Ser. No. 5,376, Jan. 29, 1960, abandoned. This application Apr. 7, 1975, Ser. No. 565,864

Int. Cl.[2] A61K *17/02, 27/00*

U.S. Cl. 424—177 7 Claims

1. A composition comprising (a) a pharmaceutically compatible excipient, (b) an inflammation inhibiting amount of corticosteroid, and (c) a biologically effective amount for the treatment of disease in mammals of protein mixture for enhancing metabolic functions derived by:

1 treating liver with an aqueous solution of divalent metal activating cation at a pH essentially neutral or slightly alkaline and separating the resultant solids from the liquid;

2. treating the liquid with heavy metal precipitating agent and separating the resultant precipitate from the liquid;

3. adjusting the pH of the liquid from step (2) to a range of between 8.3 and 8.5 and separating the resultant precipitate from the liquid;

4. treating the liquid from step (3) with a concentrated solution of salting out agent to precipitate undesired protein and separating the protein precipitate from the liquid;

5. adding solvent to the liquid from step (4) in an amount sufficient to give the resultant mixture a solvent concentration of 20 to 26% by volume and separating the resultant precipitate from the liquid; adding solvent to the

liquid in an amount sufficient to give the resultant mixture a solvent concentration to 35 to 40% by volume to produce a mixture having three layers; separating the upper layer and adding to it in amount sufficient to give the resultant mixture a solvent content 70 and 77% by volume whereby protein is precipitated;

6. separating the protein precipitate and dispersing it in a solvent at a pH of 7.8 to 8.2;
7. dialyzing the dispersion from step (6);
8. heating the dialyzate from step (7) to a temperature between 46 and 50° C. and separating the resultant precipitate from the liquid;
9. subjecting the liquid from step (8) to electrophoresis and recovering a biologically active protein mixture.

2. A method of treating disease conditions in the group consisting of cirrhosis of the liver, scar tissue, tissue damage, wounds and arthritis comprising administering a therapeutically effective amount of protein mixture derived by:

1. treating liver with an aqueous solution of divalent metal activating cation at a pH essentially neutral or slightly alkaline and separating the resultant solids from the liquid;
2. treating the liquid with heavy metal precipitating agent and separating the resultant precipitate from the liquid;
3. adjusting the pH of the liquid from step (2) to a range of between 8.3 and 8.5 and separating the resultant precipitate from the liquid;
4. treating the liquid from step (3) with a concentrated solution of salting out agent to precipitate undesired protein and separating the protein precipitate from the liquid;
5. adding solvent to the liquid from step (4) in an amount sufficient to give the resultant mixture a solvent concentration of 20 to 26% by volume and separating the resultant precipitate from the liquid; adding solvent to the liquid in an amount sufficient to give the resultant mixture a solvent concentration to 35 to 40% by volume to produce a mixture having three layers; separating the upper layer and adding to it in amount sufficient to give the resultant mixture a solvent content 70 and 77% by volume whereby protein is precipitated;
6. separating the protein precipitate and dispersing it in a solvent at a pH of 7.8 to 8.2;
7. dialyzing the dispersion from step (6);
8. heating the dialyzate from step (7) to a temperature between 46° and 50° C. and separating the resultant precipitate from the liquid;
9. subjecting the liquid from step (8) to electrophoresis and recovering a biologically active protein mixture.

4,024,248

PEPTIDES HAVING LH-RH/FSH-RH ACTIVITY

Wolfgang Konig, Langenhain, Taunus; Rolf Geiger, and Jurgen Kurt Sandow, both of Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 7, 1975, Ser. No. 602,910

Claims priority, application Germany, Aug. 9, 1974, 2438350

Int. Cl.² A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **5 Claims**

1. A peptide of the formula

$$\text{Glu-His-Trp-Ser-Tyr-X-Leu-Arg-Pro-Y,}$$

wherein X is D-Ser (Bu^t), D-Cys (Bu^t), D-Asp (OBu^t), D-Glu (OBu^t), D-Orn (Boc), or D-Lys (Boc) and Y is glycinamide, NH-ethyl, or NH-cyclopropyl.

4. Pharmaceutical preparations for peroral, intranasal, intramuscular, subcutaneous, or intravenous administration to cause release of the luteinizing hormone (LH) and follicle stimulating hormone (FSH), said preparations comprising an effective amount of a compound as in Claim 1 in combination with a pharmaceutical carrier.

4,024,249

HETEROARYLACETAMIDO CEPHALOSPORIN

Beat Müller, Reinach; Heinrich Peter, Binningen; Peter Schneider, Basel, and Hans Bickel, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

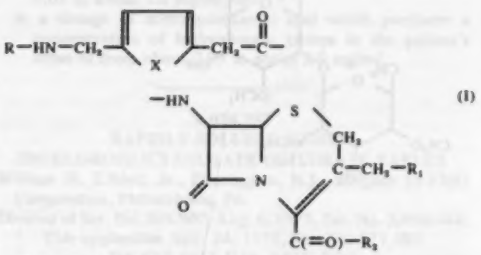
Continuation-in-part of Ser. No. 451,262, March 14, 1974, abandoned. This application Mar. 24, 1975, Ser. No. 561,444

Claims priority, application Switzerland, Mar. 30, 1973, 4608/72; Aug. 21, 1974, 11437/74

Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **8 Claims**

1. A compound of the formula



(I)

wherein X denotes sulphur or oxygen, R denotes hydrogen or an amino protective group, R_1 denotes a radical —S—R_4, wherein R_4 is tetrazolyl, thiadiazolyl or tetrazolyl or thiadiazolyl substituted by lower alkyl, or a radical —S—R_5, wherein R_5 is N-oxido-pyridazinyl or N-oxido-pyridazinyl substituted by lower alkyl, and R_2 denotes hydroxyl or a carboxyl protective radical which together with the carbonyl grouping of the formula —C(=O)— forms a protected carboxyl group, and their therapeutically acceptable salts.

4,024,250

USE OF DIETARY FRUCTOSE IN THE CONTROL OF HUMAN STRESS RESPONSE

J. Daniel Palm, 117 Nevada St., Northfield, Minn. 55057

Continuation-in-part of Ser. No. 392,316, Aug. 28, 1973. This application Sept. 10, 1975, Ser. No. 612,031

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **7 Claims**

1. A method for relieving the physiologically-induced stress response in the human body which comprises the steps of restricting the consumption of carbohydrates and substituting for said carbohydrates a substantially pure fructose dietary supplement.

4,024,251

ANTIBIOTIC FR-02A AND THERAPEUTIC COMPOSITIONS THEREOF

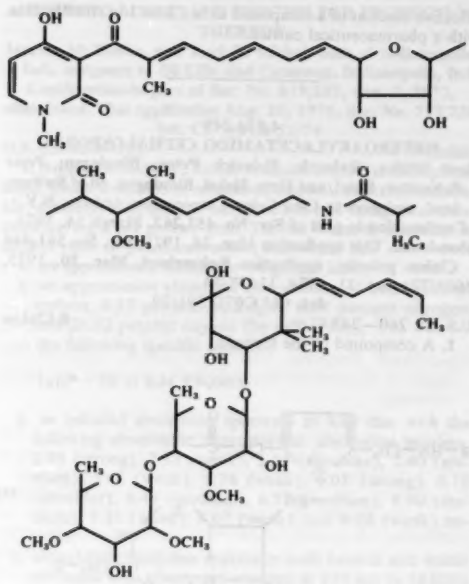
William M. Maiese, Bridgewater, and Richard G. Wax, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 496,957, Aug. 13, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,512

Int. Cl.² A61K *31/71;* **C07H** *3/06*

U.S. Cl. 424—181 **8 Claims**

1. A compound designated FR-02A having the structure:



and pharmaceutically acceptable non-toxic salts thereof.

3. A composition comprising an antibacterially effective amount of FR-02A or its pharmaceutically acceptable salts and a non-toxic pharmaceutically acceptable excipient.

4,024,252
2-(5-ETHYL-6-BROMOTHIAZOLO[3,2-B]-5-TRIAZOLYL)THIOPHOSPHONATE ESTERS, COMPOSITIONS AND METHOD OF USE

Mitsuo Asada, Hiratsuka; Meiki Ando; Michihiko Matsuda, both of Oiso; Tomio Yamada; Hitoshi Watanabe, both of Hiratsuka; Saburo Kano, and Osami Nomura, both of Odawara, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

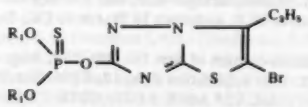
Continuation-in-part of Ser. No. 386,020, Aug. 6, 1973, abandoned, which is a continuation-in-part of Ser. No. 319,490, Sept. 9, 1975, Pat. No. 3,904,639. This application June 19, 1975, Ser. No. 588,617

Claims priority, application Japan, Apr. 7, 1973, 48-39714

Int. Cl.² A01N 9/36

U.S. Cl. 424—200 **8 Claims**

1. An insecticidal composition useful in the combatting of the phytophagous insect, mosquito, rice stem borer, cabbage army worm and fly, consisting essentially of a carrier and an insecticidally effective amount of a compound represented by the formula



wherein R_1 is alkyl having 1 to 3 carbon atoms.

4,024,253
TREATMENT OF ELEVATED HISTAMINE AND URIC ACID LEVELS

Hamao Umezawa; Tomio Takeuchi, both of Tokyo; Akira Takamatsu, and Kenji Kayahara, both of Yokohama, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

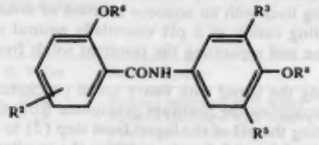
Division of Ser. No. 461,772, April 17, 1974, Pat. No. 3,973,038. This application Apr. 5, 1976, Ser. No. 674,009

Claims priority, application Japan, Apr. 20, 1973, 48-44922; Dec. 10, 1973, 48-140111

Int. Cl.² A61K 31/60, 31/235, 31/22

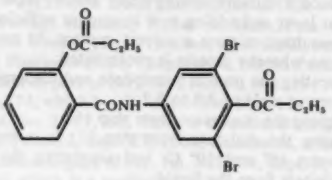
U.S. Cl. 424—230 **18 Claims**

1. A method for chemotherapeutically treating a living animal having a biochemical disorder characterized by an abnormally high body level of histamine which comprises administering a compound having the formula



wherein R^6 and R^9 are alike and are benzoyl or alkanoyl; R^2 is substituted either at the 4′- position or at the 5′-position and is hydrogen, fluoro, bromo, chloro, hydroxy or lower alkyl; R^3 is chloro, bromo or lower alkyl; and R^5 is hydrogen, fluoro, bromo, chloro or lower alkyl to said animal in a dosage sufficient to lower said histamine level.

9. A method of claim 1 for chemotherapeutically treating a living animal having a biochemical disorder characterized by an abnormally high body level of histamine which comprises administering the compound having the formula



to said animal in a dosage sufficient to lower said histamine level.

4,024,254
S-ESTERS OF NITRO(TETRAHYDRO-2H-1,3-THIAZIN-2-YLIDENE)ETHANETHIOIC ACID

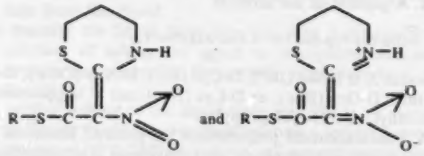
Steven A. Roman, Oakdale, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 11, 1976, Ser. No. 665,983

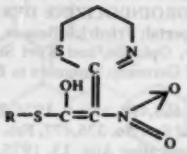
Int. Cl.² C07D 279/06

U.S. Cl. 424—246 **3 Claims**

1. A resonance hybrid in which the significant forms are represented by the formulae



and the enol forms represented by the formula



wherein R contains up to thirty carbon atoms and is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, alkadienyl, haloalkyl, haloalkenyl, mono- and poly-(alkoxy)alkyl, alkylthioalkyl, phenylthioalkyl, benzylthioalkyl, cyanoalkyl, hydroxyalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, phenyl, phenalkyl, phenylalkenyl or any of these substituted on the ring by one or two of one or more of halogen, nitro, cyano, alkyl, phenyl, alkoxy, methylenedioxy or phenoxy; is aminoalkyl, $(CH_2)_mNR^3R^4$, wherein *m* is one or two, R^3 is alkyl, cycloalkyl, alkenyl, phenyl or phenalkyl, and R^4 is hydrogen or one of the moieties represented by R^3; or is $(CH_2)_nR^5$, wherein *n* is zero, one or two, and R^5 is a heterocyclic moiety selected from furanyl, tetrahydrofuranyl, dioxolanyl, thienyl, thiopyranyl, pyridinyl, pyrrolidinyl, morpholinyl, and their R^4-methyl-counterparts.

4,024,255

TETRAZOLE CONTAINING NAPHTHYRIDINE-3-CARBOXAMIDES

Gwynn Pennant Ellis, Cardiff, Wales; Ian Collins, London, England; David Martin Waters, London, England, and David Edmund Bays, London, England, assignors to Allen & Hanburys Limited, London, England

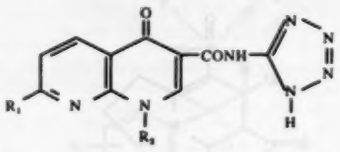
Division of Ser. No. 455,072, March 27, 1974, Pat. No. 3,943,141. This application Sept. 25, 1975, Ser. No. 616,880

Claims priority, application United Kingdom, Apr. 5, 1973, 16278/73

Int. Cl.² C07D *471/04;* **A61K** *31/535*

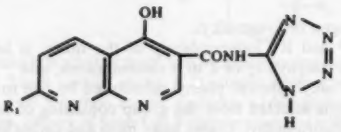
U.S. Cl. 424—248.54 **7 Claims**

1. A compound of the formula



(I)

or the formula



(II)

in which R_1 represents pyrrolidinyl, piperidino, morpholino, piperazinyl or N-methyl-piperazinyl group, and R_2 represents a hydrogen atom, a C_{2-6} alkenyl group, a C_{1-6} alkyl group, a C_{1-6} alkyl group substituted by at least one hydroxy, C_{1-6} alkoxy group, C_{1-6} alkanoyloxy, phenyl, amino, C_{1-6} alkylamino, di C_{1-6} alkylamino, diphenyl C_{1-6} alkylamino or N,C_{1-6} alkyl, N-phenyl C_{1-6} alkylamino group; or a pharmaceutically acceptable salt of a compound of formula I or II.

7. A method of treating a patient suffering from or liable to a condition resulting primarily from the combination of an antigen with a reaginic antibody in which the condition is extrinsic asthma, hay fever, urticaria, exzema or atopic dermatitis which comprises administering to said patient by oral ingestion or inhalation an effective amount of a compound as claimed in claim 1, if desired in the form of a pharmaceutically acceptable salt to alleviate said condition.

4,024,256

METHOD AND COMPOSITION FOR TREATING URINARY TRACT INFECTIONS

Donald P. Griffith, 4425 Hazelton, and Daniel M. Musher, 4903 Heatherglen, both of Houston, Tex. 77035

Continuation-in-part of Ser. No. 441,245, Feb. 11, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,684

Int. Cl.² A61K *31/53*

U.S. Cl. 424—249 **6 Claims**

1. A method of treating urinary infections which comprises administering to a patient suffering from a urinary infection associated with presence in the urine of bacteria of the species Proteus, an effective anti-bacterial dosage of a composition comprising in combination

a. a dosage of methenamine which produces a concentration of methenamine in the patient's urine of from about 0.05 to about 1.0 mg/ml; and

b. a dosage of acetohydroxamic acid which produces a concentration of hydroxamate groups in the patient's urine of from about 0.05 to about 2.0 mg/ml.

4,024,257

RAPIDLY-SOLUBLE SODIUM DICHLOROISOCYANURATE DIHYDRATE TABLET

William H. Kibbel, Jr., Pennington, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 385,907, Aug. 6, 1973, Pat. No. 3,956,444. This application Apr. 24, 1975, Ser. No. 571,201

Int. Cl.² A61J *3/10;* **A61K** *9/20*

U.S. Cl. 424—249 **3 Claims**

1. A rapidly-soluble, structurally-strong, storage-stable compressed tablet consisting essentially of rapidly-soluble chlorine-releasing sodium dichloroisocyanurate dihydrate wherein said tablet has been compressed at pressures from about 2,000 to about 10,000 p.s.i. in the absence of lubricants or stabilizers, and resists deterioration or dimensional change due to moisture.

4,024,258

COMPOSITION OF AND METHOD FOR REDUCING HYPERTENSION WITH A 1-[1-(INDOL-3-YLETHYL)-PIPERAZIN-4-YL]-3-SUBSTITUTED UREA

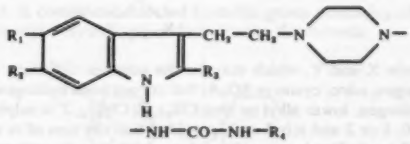
Edward J. Glamkowski, Warren, and Philip A. Reitano, Raritan, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Division of Ser. No. 475,316, May 31, 1974, Pat. No. 3,948,918. This application Oct. 17, 1975, Ser. No. 623,337

Int. Cl.² A61K *31/495*

U.S. Cl. 424—250 **10 Claims**

1. A method of reducing hypertension which comprises orally or parenterally administering to a patient in need of such treatment an effective amount of an active compound of the formula



wherein R_1 and R_2 are hydrogen or alkoxy of from 1 to 3 carbon atoms; R_3 is hydrogen or alkyl of from 1 to 3 carbon atoms; and R_4 is alkyl of from 1 to 4 carbon atoms, cycloalkyl of from 3 to 8 carbon atoms, phenyl, or phenyl mono-, di-, or

tri-substituted by halogen, alkyl of from 1 to 3 carbon atoms, alkoxy of from 1 to 2 carbon atoms, trifluoromethyl or nitro; or a physiologically tolerable acid addition salt thereof.

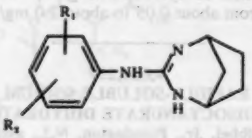
6. An orally administrable composition for reducing hypertension which consists essentially of a pharmaceutically acceptable carrier and from about 0.1–100 milligrams of the active compound defined in claim 1.

4,024,259
3-ANILINO-2,4-DIAZABICYCLO[3.2.1]OCTENES

Victor John Bauer, Somerville; Lawrence Leo Martin, Lebanon, and Brian John Duffy, Flanders, all of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Jan. 26, 1976, Ser. No. 652,151
Int. Cl.² C07D *239/70;* A61K *31/505*
U.S. Cl. 424—251 **11 Claims**

1. A compound of the formula



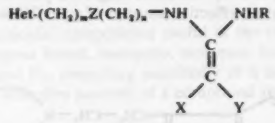
wherein R^1 and R^2 are the same or different and represent hydrogen, halogen, lower alkoxy, lower alkyl, nitro or trifluoromethyl; or a physiologically tolerable acid addition salt thereof.

4,024,260
ETHYLENE DERIVATIVES

Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote; Charon Robin Ganellin, Welwyn Garden City, and Hunter Douglas Prain, Welwyn, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Continuation-in-part of Ser. No. 468,617, May 9, 1974, Pat. No. 3,953,460. This application Nov. 11, 1975, Ser. No. 631,028
Int. Cl.² A61K *31/44*
U.S. Cl. 424—263 **16 Claims**

1. A pharmaceutical composition to inhibit H-2 histamine receptors comprising a pharmaceutical carrier and in an effective amount to inhibit said receptors a heterocyclic compound of the formula:



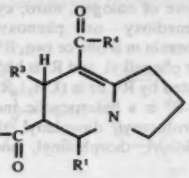
wherein X and Y, which may be the same or different, are hydrogen, nitro, cyano or SO_2Ar but are not both hydrogen; R is hydrogen, lower alkyl or $Het(CH_2)_mZ(CH_2)_n$; Z is sulphur; *m* is 0, 1 or 2 and n is 2 or 3, provided that the sum of *m* and *n* is 3 or 4; Het is a pyridine ring which ring is optionally substituted by lower alkyl, hydroxyl, halogen or amino; and Ar is an aryl group such as phenyl optionally substituted by halogen or methyl or a pharmaceutically acceptable acid addition salt thereof.

4,024,261
COMPOSITIONS AND METHODS EMPLOYING TETRAHYDROINDOLIZINE DERIVATIVES

Horst Meyer, Wuppertal; Friedrich Bossert, Wuppertal-Elberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal-Vohwinkel, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 468,458, May 9, 1974, Pat. No. 3,951,994, which is a division of Ser. No. 336,477, Feb. 28, 1973, Pat. No. 3,856,798. This application Aug. 13, 1975, Ser. No. 604,257
Claims priority, application Germany, Mar. 6, 1972, 2210633
Int. Cl.² A61K *31/44*
U.S. Cl. 424—263 **21 Claims**

1. A pharmaceutical composition comprising a compound of the formula:



wherein

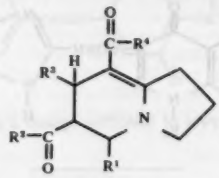
R^1 is hydrogen or lower alkyl;

each of R^2 and R^4, independently of the other, is lower alkoxy or alkynyloxy of 2 to 4 carbon atoms; and

R^3 is lower alkyl; phenyl; phenyl substituted by one to two substituents selected from the group consisting of lower alkyl, trifluoromethyl, cyano, halo, nitro and carbo(lower alkoxy); pyridyl; furyl; thienyl; or naphthyl;

in combination with a nontoxic inert pharmaceutical carrier, said compound being present in said composition in an amount sufficient to produce coronary vessel dilation and an antihypertensive effect in an animal.

11. A method of producing coronary vessel dilation and an antihypertensive effect in animals which comprises administering to said animals a compound of the formula:



wherein

R^1 is hydrogen or lower alkyl;

each of R^2 and R^4, independently of the other, is lower alkoxy or alkynyloxy of 2 to 4 carbon atoms; and

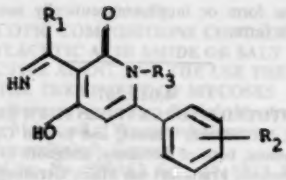
R^3 is lower alkyl; phenyl; phenyl substituted by one to two substituents selected from the group consisting of lower alkyl, trifluoromethyl, cyano, halo, nitro and carbo(lower alkoxy); pyridyl; furyl; thienyl; or naphthyl; in an amount sufficient to produce coronary vessel dilation and an antihypertensive effect.

4,024,262
SUBSTITUTED HYDROXY PYRIDONES

Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 602,324, Aug. 6, 1975, abandoned. This application Mar. 5, 1976, Ser. No. 664,237
Int. Cl.² A61K *31/44*
U.S. Cl. 424—263 **9 Claims**

1. A compound of the formula



where

R_1 represents lower alkyl or cycloalkyl,

R_2 represents hydrogen, halo having an atomic weight of about 19 to 36, lower alkyl or alkoxy, and

R_3 represents straight chain lower alkyl, or a pharmaceutically acceptable salt thereof.

4,024,263

1,3-DIHYDROSPIRO[ISOBENZOFURAN-1,4'-PIPERIDINE]S

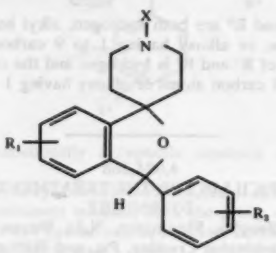
Solomon Samuel Klioze, Flemington, and Victor John Bauer, Somerville, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Apr. 30, 1975, Ser. No. 573,145

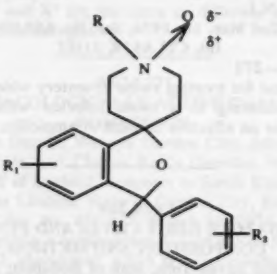
Int. Cl.² C07D *491/10*

U.S. Cl. 424—267 **13 Claims**

1. A compound of the formula



or



wherein R is alkyl of from 1 to 4 carbon atoms or phenalkyl of from 7 to 9 carbon atoms; X is nitroso, amino, alkylamino of from 1 to 5 carbon atoms, hydroxy, or benzoyloxy; R_1 is hydrogen, alkoxy of from 1 to 3 carbon atoms or trifluoromethyl; R_2 is hydrogen, alkoxy of from 1 to 3 carbon atoms, bromine, fluorine or chlorine; or a pharmaceutically acceptable acid addition salt thereof.

4,024,264

DIPHENYLBUTYLPIPERIDINES

Anders Karl Konrad Bjork, Bjarred; Sven Erik Harry Hernestam, Malmo, and Bengt Erik Sigvard Kjellberg, Staffanstorp, all of Sweden, assignors to AB Ferrosan, Malmo, Sweden

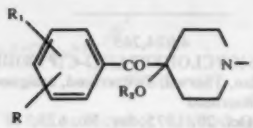
Filed Aug. 4, 1975, Ser. No. 601,412

Claims priority, application United Kingdom, Aug. 15, 1974, 35910/74; May 7, 1975, 19222/75

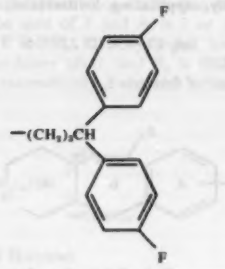
Int. Cl.² C07D *211/30, 211/50*

U.S. Cl. 424—267 **54 Claims**

1. A compound selected from the group consisting of (a) 4-benzoyl-4-hydroxy or acyloxy-1-(4,4-diphenylbutyl)-piperidines having the formula

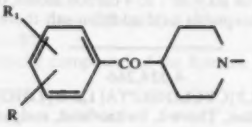


I

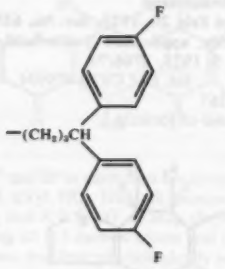


wherein R and R_1 independently represent hydrogen, a lower-alkyl group of one to five carbon atoms inclusive, fluorine, chlorine, bromine, lower-alkoxy of one to five carbon atoms inclusive, or trifluoromethyl, and R_2 represents hydrogen or an acyl group of one to nineteen carbon atoms inclusive, and (b) acid addition salts thereof.

27. A compound selected from the group consisting of (a) 4-benzoyl-1-(4,4-diphenylbutyl)-piperidines having the formula

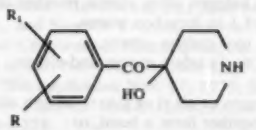


IV



wherein R and R_1 independently represent hydrogen, a lower-alkyl group of one to five carbon atoms inclusive, fluorine, chlorine, bromine, lower-alkoxy of one to five carbon atoms inclusive, or trifluoromethyl, and (b) acid addition salts thereof.

41. A compound selected from the group consisting of (a) 4-benzoyl-4-hydroxypiperidines having the formula



VII

wherein R and R_1 independently represent hydrogen, a lower-alkyl group of one to five carbon atoms inclusive, fluorine,

chlorine, bromine, lower-alkoxy of one to five carbon atoms inclusive, or trifluoromethyl, and (b) acid addition salts thereof.

4,024,265

BENZO[5,6]CYCLOHEPTA[1,2-C]PYRIDINES

Jean-Michel Bastian, Therwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

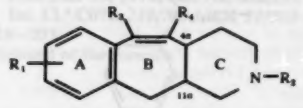
Filed Oct. 20, 1975, Ser. No. 623,777

Claims priority, application Switzerland, Oct. 24, 1974, 14240/74

Int. Cl.² C07D *221/16*

U.S. Cl. 424—267 29 Claims

1. A compound of formula I,



wherein

R_1 is a hydrogen, alkyl of 1 to 4 carbon atoms, fluorine, chlorine or bromine,

R_2 is hydrogen, alkyl of 1 to 4 carbon atoms, cycloalkylalkyl of 4 to 10 carbon atoms, alkenyl of 3 to 6 carbon atoms or alkinyl of 3 to 6 carbon atoms, the multiple bond thereof being other than adjacent to the nitrogen atom of the tricyclic ring system, oxoalkyl of 2 to 5 carbon atoms, the oxygen atom thereof being separated by at least two carbon atoms from the nitrogen atom of the tricyclic ring system, or phenylalkyl of 7 to 10 carbon atoms,

R_3 is hydrogen or alkyl of 1 to 4 carbon atoms, and

R_4 is hydrogen or alkyl of 1 to 4 carbon atoms, or a pharmaceutically acceptable acid addition salt thereof.

4,024,266

4H-BENZO[4,5]CYCLOHEPTA[1,2-B]THIOPHENES

Jean-Michel Bastian, Therwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

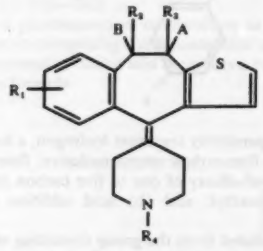
Filed Feb. 20, 1976, Ser. No. 659,779

Claims priority, application Switzerland, Feb. 26, 1975, 2437/75; Mar. 5, 1975, 2766/75

Int. Cl.² C07D *409/04*

U.S. Cl. 424—267 21 Claims

1. A compound of formula I,



wherein

R_1 is hydrogen, halogen of an atomic number of from 9 to 35, or alkyl of 1 to 4 carbon atoms,

R_2 is alkyl of 1 to 4 carbon -atoms,

R_4 is alkyl of 1 to 4 carbon atoms, and either

(i)

R_3 is hydrogen or alkyl of 1 to 4 carbon atoms, and

A and B together form a bond, or

(ii)

R_3 is hydrogen, and

A and B are both hydrogen,

in free base form or in pharmaceutically acceptable acid addition salt form.

4,024,267

SUBSTITUTED HYDROXYPHENYL-PIPERIDONES

Otto Mauz, Liederbach, Taunus, and Ernold Granzer, Kelkheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

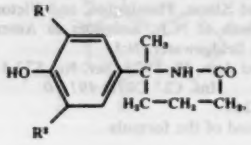
Filed July 9, 1975, Ser. No. 594,437

Claims priority, application Germany, July 11, 1974, 2433234

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 4 Claims

1. A pharmaceutical composition for the treatment of hyperlipidemia, said composition comprising an effective amount of a piperidone compound of the formula



wherein R^1 and R^2 are both hydrogen, alkyl having 1 to 9 carbon atoms, or alkoxy having 1 to 9 carbon atoms, or wherein one of R^1 and R^2 is hydrogen and the other is alkyl having 1 to 9 carbon atoms or alkoxy having 1 to 9 carbon atoms.

4,024,268

USE OF AMPICILLIN FOR THE TREATMENT OF SWINE DYSENTERY

Charles O. Baughn, Flemington, N.J.; Wayne H. Linkenheimer, Washington Crossing, Pa., and William E. Brown, Princeton, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 18, 1976, Ser. No. 668,005

Int. Cl.² A61K *31/43*

U.S. Cl. 424—271 5 Claims

1. A method for treating swine dysentery which comprises orally administering to a swine infected with *Treponema hyodysenteriae* an effective amount of ampicillin.

4,024,269

BENZIMIDAZOLE DERIVATIVES AND FUNGICIDAL COMPOSITION AND METHOD

Geza Toth, and Istvan Toth, both of Budapest, Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary

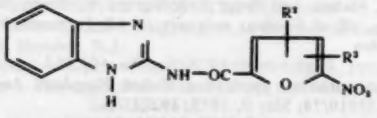
Continuation-in-part of Ser. No. 571,763, April 25, 1975, Pat. No. 3,978,075. This application June 16, 1976, Ser. No. 696,764

Claims priority, application Hungary, May 2, 1974, 1473

Int. Cl.² C07D *405/12*

U.S. Cl. 424—273 4 Claims

1. A compound of the formula



and the antifungal and pharmaceutically effective salts thereof wherein R^2 and R^2 are each hydrogen or C_1–C_6 alkyl.

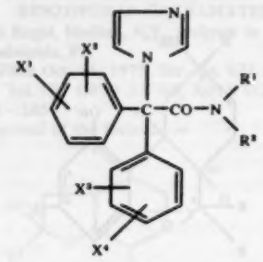
4,024,270

ANTIMYCOTIC COMPOSITIONS CONTAINING AN IMIDAZOLYLACETIC ACID AMIDE OR SALT THEREOF AS THE ACTIVE AGENT AND THE USE THEREOF IN THE TREATMENT OF MYCOSES

Jürgen Wenzelburger; Karl Heinz Büchel; Manfred Plempel, and Werner Meiser, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 400,263, Sept. 24, 1973, Pat. No. 3,950,354. This application July 9, 1975, Ser. No. 594,195
Claims priority, application Germany, Sept. 26, 1972, 2247187
Int. Cl.² A61K *31/415*
U.S. Cl. 424—273 30 Claims

16. A method of treating mycoses in humans and animals which comprises administering to a human or animal in need thereof an antimycotically effective amount of an imidazolylacetic acid amide of the formula



or a pharmaceutically acceptable nontoxic salt thereof wherein

R^1 is phenyl or cyclohexyl, unsubstituted or substituted by 1 to 3 substituents selected from the group consisting of alkyl of 1 to 3 carbon atoms, chlorine, fluorine, trifluoromethyl and nitro, and

R^2 is hydrogen; and

X^1, X^2, X^3 and X^4 are the same or different and are each hydrogen or halogen.

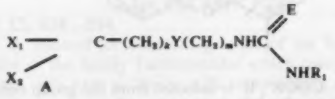
4,024,271

PHARMACOLOGICALLY ACTIVE GUANIDINE COMPOUNDS

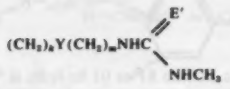
Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Division of Ser. No. 450,957, March 14, 1974, Pat. No. 3,950,333, which is a continuation-in-part of Ser. No. 290,584, Sept. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,451, Feb. 29, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,499
Claims priority, application Ireland, Feb. 3, 1972, 136/72
Int. Cl.² A61K *31/40*, *31/495*, *31/505*
U.S. Cl. 424—274 13 Claims

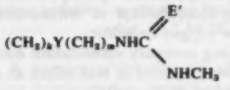
1. A method of inhibiting H-2 histamine receptors which comprises administering to an animal in need of inhibition of said receptors in an effective amount to inhibit said receptors a heterocyclic compound of the formula:



wherein A is such that there is formed together with the carbon atom shown an unsaturated heterocyclic nucleus, said unsaturated heterocyclic nucleus being an imidazole, pyrazole, pyrimidine, pyrazine or pyridazine ring; X_1 is hydrogen, lower alkyl, hydroxyl, trifluoromethyl, benzyl, halogen, amino or



in which E' is NH or N-cyano; X_2 is hydrogen or when X_1 is lower alkyl, lower alkyl or halogen; k is 0 to 2 and m is 2 or 3, provided that the sum of k and m is 3 or 4; Y is oxygen, sulphur or NH; E is NR_2; R_1 is hydrogen, lower alkyl or di-lower alkylamino-lower alkyl; and R_2 is hydrogen, nitro or cyano, or a pharmaceutically acceptable addition salt thereof



when E is NH or N-cyano.

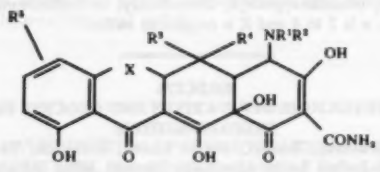
4,024,272

TETRACYCLIC COMPOUNDS

Werner Rogalski; Richard Kirchlechner; Jürgen Seubert; Rudolf Gottschlich; Rosmarie Steinigeweg; Rolf Bergmann; Helmut Wahlig, and Joachim Gante, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Aug. 26, 1975, Ser. No. 607,803
Claims priority, application Germany, Sept. 6, 1974, 2442829
Int. Cl.² C07D *335/16*
U.S. Cl. 424—275 20 Claims

1. A tetracyclic compound of the formula



wherein R^1, R^2, R^3 and R^4 in each case are H or alkyl; R^5 is H, F, Cl, Br, CF_3, OH, alkyl, NO_2, NH_2, alkylamino, dialkylamino or alkanoylamino; and X is S, SO, or SO_2, alkyl and alkoxy in each instance being of 1–3 carbon atoms and alkanoyl being of 1–4 carbon atoms; and their physiologically acceptable acid addition salts.

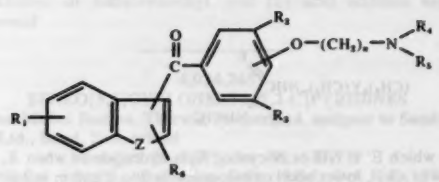
4,024,273

CORONARY VASODILATOR AND ANTI-ANGINAL COMPOSITIONS COMPRISING SUBSTITUTED BENZOFURANS AND BENZOTHIOPHENES AND METHODS OF PRODUCING CORONARY VASODILATION AND ANTI-ANGINAL ACTIVITY

L. Martin Brenner, Havertown, Pa.; John M. Petta, Willingboro, N.J., and Stephen T. Ross, Berwyn, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

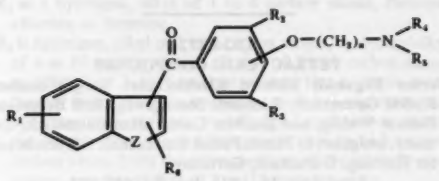
Division of Ser. No. 481,283, June 20, 1974, Pat. No. 3,947,470. This application Nov. 17, 1975, Ser. No. 632,558
Int. Cl.² A61K *31/38*, *31/34*
U.S. Cl. 424—275 12 Claims

11. A pharmaceutical composition having coronary vasodilator activity comprising a pharmaceutical carrier and, in an amount to produce said activity, a compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof, in which the aminoalkoxy side chain is in the para position of the benzoyl ring; R_1 is hydrogen or halo in the 5-position; R_2 and R_3 are hydrogen; R_4 and R_5 are ethyl, n-propyl or n-butyl; R_6 is tolyl, chlorophenyl, bromophenyl, methoxyphenyl, trifluoromethylphenyl, dimethylphenyl, dichlorophenyl, dimethoxyphenyl, trimethoxyphenyl, chlorobenzyl or trifluoromethylbenzyl; n is 2 to 4 and Z is oxygen or sulfur.

12. A method of producing coronary vasodilation comprising administering to an animal in need of said effect an effective amount of a compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof, in which the aminoalkoxy side chain is in the para position of the benzoyl ring; R_1 is hydrogen or halo in the 5-position; R_2 and R_3 are hydrogen; R_4 and R_5 are ethyl, n-propyl or n-butyl; R_6 is tolyl, chlorophenyl, bromophenyl, methoxyphenyl, trifluoromethylphenyl, dimethylphenyl, dichlorophenyl, dimethoxyphenyl, trimethoxyphenyl, chlorobenzyl or trifluoromethylbenzyl; *n* is 2 to 4 and Z is oxygen or sulfur.

4,024,274

BENZYLAMINE DERIVATIVES AND PROCESS FOR PREPARING THEM

Eike Druckrey, Rossert; Bernd Knabe, Kelkheim, Taunus; Hans-Jochen Lang, Altenhain, Taunus; Milos Babej, and Roman Muschaweck, both of Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

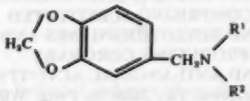
Filed Jan. 21, 1975, Ser. No. 542,699

Claims priority, application Germany, Jan. 23, 1974, 2403138

Int. Cl.² A61K *31/36*

U.S. Cl. 424—282 **7 Claims**

1. A benzylamine of the formula



wherein R^1 is hydrogen or methyl and R^2 is adamantyl or cyclooctyl.

6. Pharmaceutical compositions in dosage unit form having sali-diuretic action, consisting essentially from about 5 to 500 mg of a compound as defined in claim 1 as the active substance.

7. Method of treating edemas and/or essentially hypertonia of human beings, which comprises administering an effective amount of a composition containing as the active ingredient a compound as defined in claim 1.

4,024,275

METHOD OF REDUCING ELEVATED BLOOD PRESSURE WITH DIHYDROXY-HEXAHYDRODIBENZO(B,D)PYRANS

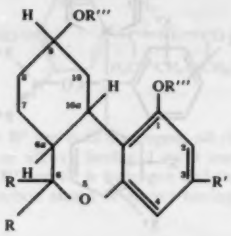
Robert A. Archer, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 413,010, Nov. 5, 1973, Pat. No. 3,968,125. This application Apr. 2, 1976, Ser. No. 672,911

Int. Cl.² A61K *31/35*

U.S. Cl. 424—283 **3 Claims**

1. A method of reducing blood pressure in mammals which comprises administering from 0.001 to 100 mg. per day to a mammal having an abnormally elevated blood pressure of a compound of the formula



wherein R′ is

wherein R″ is C_1–C_7 alkyl, R^7 is H or methyl, each R‴ is individually hydrogen or C_1–C_4 alkanoyl, and wherein both R's are the same and can be hydrogen or methyl.

4,024,276

XANTHONE-2-CARBOXYLIC ACID COMPOUNDS

Alan Charles Barnes, Purton, Swindon; Peter Wilfred Hairsine, Swindon; Peter John Ramm, Blunsdon, Swindon, and John Bodenham Taylor, Down Ampney, near Cirencester, all of England, assignors to Roussel-UCLAF, Paris, France

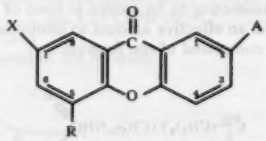
Filed July 1, 1975, Ser. No. 592,176

Claims priority, application United Kingdom, July 9, 1974, 30428/74; May 16, 1975, 20876/75

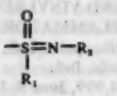
Int. Cl.² C07D *311/86*

U.S. Cl. 424—283 **14 Claims**

1. A compound of the formula



wherein A is —COOR′, R′ is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms and cation of a non-toxic, pharmaceutically acceptable organic or inorganic base, R is selected from the group consisting of hydrogen, alkyl of 1 to 9 carbon atoms, alkoxy of 1 to 9 carbon atoms and alkoxy alkoxy of 2 to 9 carbon atoms and X is



R_1 is alkyl of 1 to 5 carbon atoms, R_2 is selected from the group consisting of hydrogen, acyl of an aliphatic acid of 1 to 5 carbon atoms, aroyl of 7 to 8 carbon atoms, araliphatic acyl with 1 to 5 carbon atoms in the aliphatic portion and 6 or 7 carbon atoms in the aryl portion, aralkyl of 7 to 8 carbon atoms, and arylsulfonyl.

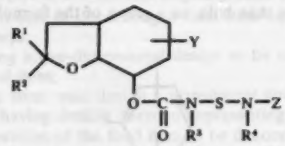
13. A method of relieving allergic symptoms in warm-blooded animals comprising administering to warm-blooded animals an anti-allergically effective amount of at least one compound of claim 1.

4,024,277
PHOSPHORO-AMINOSULFENYL DERIVATIVES OF BENZOFURAN CARBAMATES

John Francis Engel, Medina, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed Oct. 16, 1975, Ser. No. 623,195
Int. Cl.² C07D *307/86;* A01N *9/28*
U.S. Cl. 424—285 14 Claims

1. A compound of the formula

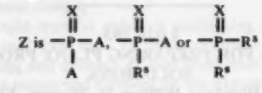


wherein

R^1 and R^2 are each hydrogen or lower alkyl (C_1 to C_6) and can be the same or different;

R^3 is lower alkyl (C_1 to C_6 [alkyl]);

R^4 is hydrogen, lower alkyl (C_1 to C_6), [cycloalkyl (C_3–C_6), aralkyl or aryl] phenyl-lower alkyl (C_1 to C_6) or phenyl; and



where

X is O or S, A is OR^5, [SR^5, NHR^5 or NR^5R^6], and R^5 and R^6 are each lower alkyl (C_1 to C_6) [, cycloalkyl] or [aryl] phenyl and can be the same or different; and

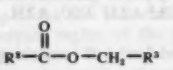
Y is hydrogen, halo or methyl.

4,024,278
MITE CONTROL USING ALKYL ESTERS OF ALKYNYL ACIDS

Clive A. Henrick, Palo Alto, Calif., assignor to Zoecon Corporation, Palo Alto, Calif.

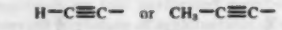
Division of Ser. No. 535,611, Dec. 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 355,846, April 30, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,538
Int. Cl.² A01N *9/24*
U.S. Cl. 424—314 7 Claims

1. A method for controlling mites of the family Tetranychidae or the family Tarsonemidae which comprises contacting the mite eggs or larvae with an ovicidally or larvacidally effective amount of a compound of the formula:



wherein,

R^2 is



and

R^3 is alkyl of 10 to 18 carbon atoms.

4,024,279
TREATMENT OF DYSMENORRHEA AND MIGRAINE SYMPTOMS

Uriel Zor; Hans Rudolph Lindner, both of Rehovot, and Arie Schwartz, Tel-Aviv, all of Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed July 24, 1975, Ser. No. 598,807
Claims priority, application Israel, July 26, 1974, 45357
Int. Cl.² A61K *31/195*
U.S. Cl. 424—319 2 Claims

1. A process of treating or alleviating the symptoms of primary dysmenorrhea, including diarrhea, in mammals, comprising administering an effective quantity of flufenamic acid, mefenamic acid or meclofenamic acid.

4,024,280
ABIETANILIDES, THEIR PRODUCTION AND USE

Hiromu Murai, Otsu; Katsuya Ohata, Uji; Hiroshi Enomoto, Kyoto; Kenji Sempuku, Suita; Koji Kitaguchi, Joyo; Yukio Fujita, Takatsuki; Yoshiaki Yoshikuni; Kohei Kura, both of Kyoto; Katsuhide Saito, Joyo; Tamiki Mori, Yokaichi, and Yasuo Yasutomi, Takatsuki, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

Filed May 12, 1975, Ser. No. 576,360
Claims priority, application Japan, May 14, 1974, 49-54093
Int. Cl.² A61K *31/165;* C07C *102/00, 103/37*
U.S. Cl. 424—324 11 Claims

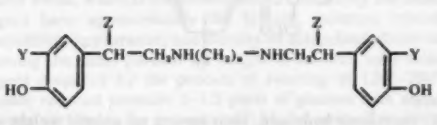
1. A diterpenic acid anilide selected from the group consisting of abietic acid anilide, dihydroabietic acid anilide, and tetrahydroabietic acid anilide.

4,024,281
N,N-BIS[2-(3-SUBSTITUTED-4-HYDROXYPHENYL)-ETHYL OR -2-HYDROXYETHYL]-POLYMETHYLENEDIAMINES

Donald F. Colella, Philadelphia, Pa., and Carl Kaiser, Haddon Heights, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 287,399, Sept. 8, 1972, Pat. No. 3,933,913, which is a continuation-in-part of Ser. No. 148,912, June 1, 1971, abandoned. This application Oct. 16, 1975, Ser. No. 623,130
Claims priority, application Saudi Arabia, May 26, 1972, 72/3611
Int. Cl.² A61K *31/165, 31/135;* C07C *103/64, 91/12*
U.S. Cl. 424—324 9 Claims

1. A pharmaceutical composition in dosage unit form having β-adrenergic stimulant activity comprising a pharmaceutical carrier and a beta-adrenergic stimulating amount of a chemical compound of the formula:

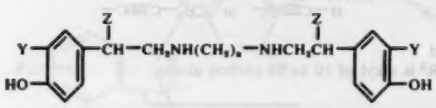


or a pharmaceutically acceptable acid addition salts of said compound, wherein:

n is a positive whole integer from 4 to 8;

Z is hydrogen or hydroxy; and
Y is NHCHO or CH_2NH_2.

2. A chemical compound of the formula:



or a pharmaceutically acceptable acid addition salt of said compound, wherein:
n is a positive whole integer from 4 to 8;
Z is hydrogen or hydroxy; and
Y is NHCHO or CH_2NH_2.

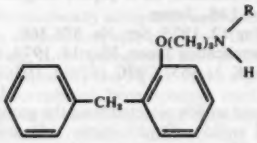
4,024,282

PHARMACEUTICALLY ACTIVE 2-(3-ALKYLAMINOPROPOXY)DIPHENYLMETHANES

Ryoji Kikumoto, Machida; Akihiro Tobe, Kawasaki; Shinji Tonomura, Tokyo, and Hidenobu Ikoma, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,147
Int. Cl.² A61K *31/135*
U.S. Cl. 424—330 **1 Claim**

1. A method for palliating conditions of depression in warm-blooded animals which comprises administering to said animal an antidepressant effective amount of a compound of the formula (I):



(I)

wherein R is C_1–C_5 alkyl, and the pharmaceutically acceptable acid addition salts thereof.

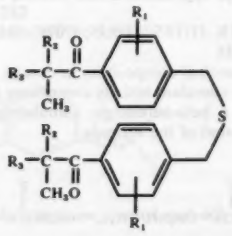
4,024,283

THIODIMETHYLENE BIS(PIVALOPHENONE)

Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Aug. 15, 1975, Ser. No. 605,070
Int. Cl.² C07C *49/76*; A61K *31/12*
U.S. Cl. 424—331 **7 Claims**

1. A compound of the formula



where
R_1 represents hydrogen, halo having an atomic weight of about 19 to 36, and
R_2 and R_3 each independently represent lower alkyl having 1 to 2 carbon atoms.

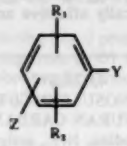
4,024,284

ETHYL- AND VINYLBENZENES AS ANTI-INFLAMMATORY AGENTS

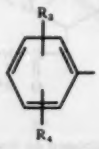
Erwin A. Stephan, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 584,999, June 9, 1975, Pat. No. 3,975,543.
This application May 26, 1976, Ser. No. 690,217
Int. Cl.² A61K *31/03, 31/015, 31/085*
U.S. Cl. 424—340 **24 Claims**

1. A method of treating inflammation in warm-blooded animals which comprises administering to a warm-blooded animal in need of such treatment an amount effective for treating inflammation of a compound of the formula,



wherein Y is a monovalent group which is either ethyl or vinyl; R_1 and R_2 are monovalent groups independently selected from the group consisting of hydrogen, halo, C_1–C_3 alkyl, and C_1–C_3 alkoxy, and Z is a monovalent group which is either C_5–C_7 cycloalkyl, with the provisos that at least one of R_1 and R_2 must be other than hydrogen and when Y is ethyl, R_1 and R_2 must be other than halo, or a group of the formula,



wherein R_3 and R_4 are monovalent groups independently selected from the group consisting of hydrogen, halo, C_1–C_3 alkyl, and C_1–C_3 alkoxy, with the provisos that at least one of R_1, R_2, R_3, and R_4 must be other than hydrogen and when Y is ethyl, R_1, R_2, R_3, and R_4 must be other than halo.

4,024,285

PROCESS FOR PREPARING PLANT PROTEASE SOLUTIONS

Jack F. Beuk, Hinsdale; William D. Warner, Elmhurst, and Chunghee K. Kang, Hinsdale, all of Ill., assignors to Swift and Company Limited, Chicago, Ill.

Filed Mar. 15, 1976, Ser. No. 667,083
Int. Cl.² A22C *18/00*
U.S. Cl. 426—2 **8 Claims**

1. A process for preparing a proteolytic enzyme solution suitable for ante-mortem intravascular injection into animals, comprising: forming an aqueous solution of a food grade or crude plant-derived protease selected from the group consisting of papain, ficin and a mixture thereof; adjusting the pH of said solution to from 11.0 to 12.5; and holding said solution at said pH for a period of time of greater than 4 hours.

4,024,286

FORTIFICATION OF FOODSTUFFS WITH C-TERMINAL AMINO ACID SUBSTITUTED METHIONINE DIPEPTIDES

Dennis Alfred Cornelius, Elkhart, and Moshe M. Sternberg, South Bend, both of Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed May 17, 1976, Ser. No. 687,378
Int. Cl.² A23J *3/00*; A23L *1/30*
U.S. Cl. 426—62 **12 Claims**

1. A proteinaceous foodstuff comprising an edible, methio-

nine deficient protein and a nutritionally supplemental amount of a bland and water-soluble C-terminal amino acid substituted methionine dipeptide, wherein the C-terminal amino acid substituent is selected from the group consisting of alanine, valine and glutamic acid.

4,024,287

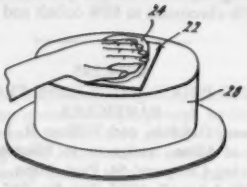
FOOD DECORATING PROCESS

Robert L. Golchert, 915 Heritage Court Apts. S. No. 203, Crown Point, Ind. 46307

Continuation of Ser. No. 599,991, July 29, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,576

Int. Cl.² A23G *3/28*; B05C *1/00*

U.S. Cl. 426—383 **4 Claims**



1. The process of decorating a food item comprising the following steps:

a. selecting a two-dimensional design to be transferred to the food item;

b. placing over said design a transparent and impervious shield having indicia thereon representing the general configuration of the food item to be decorated;

c. positioning said shield with respect to said design using said indicia to thereby facilitate the proper positioning of the design on said food item;

d. placing a sheet of moderately porous semi-transparent transfer medium over said shield and design;

e. tracing said design onto said transfer medium using one or more felt or fiber tipped pens filled with water soluble, edible colored ink or food coloring said shield protecting the original design from said ink or food coloring used in tracing said design;

f. placing said transfer medium containing said traced design on said food item to be decorated with said design side facing and contacting said food item;

g. placing a moistened element on the exposed back surface of said transfer medium and said design to cause said design to be transferred to said food item; and

h. removing said moistened element and said transfer medium from the decorated food item.

4,024,288

APPARATUS FOR TREATING FINELY DIVIDED MATERIALS WITH GASEOUS FLUID

Johan Frederik Witte, 156 Nieuwendammerdijk, Amsterdam-Nieuwendam, Netherlands

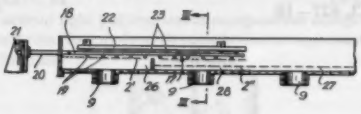
Division of Ser. No. 501,824, Aug. 29, 1974, Pat. No. 3,972,278. This application May 19, 1975, Ser. No. 579,072

Claims priority, application Netherlands, Aug. 31, 1973, 7312094

Int. Cl.² A23B *7/02*

U.S. Cl. 426—461 **6 Claims**

1. A method of treating finely divided oil containing vegetable raw materials with moisture and heat, said method comprising conveying the finely divided raw materials on a perforated member longitudinally from a rear portion thereof to a front portion thereof, vibrating said perforated member to effect the conveying of the raw materials, introducing steam through a first upstream region of the perforated member from beneath the perforated member for treating said raw materials, introducing a heated gas through a second downstream region of the perforated member for drying said raw material, the steam tending to form agglomerates of said finely divided raw materials on said perforated member, pulverizing said raw materials on said perforated member in said first region to prevent formation of agglomerates of said raw materials, and forming a step in said perforated member in said first region to cause the pulverized material to drop from one level to another in counter current with the incoming steam such that any dust formed during pulverization becomes bound to the pulverized material.



4,024,289

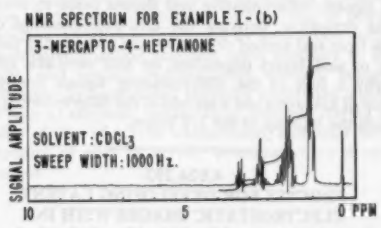
FLAVORING WITH α-OXY(OXO)MERCAPTANS

William J. Evers, Red Bank; Howard H. Heinsohn, Jr., Hazlet, and Manfred Hugo Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Sept. 15, 1976, Ser. No. 723,535

Int. Cl.² A23L *1/235*

U.S. Cl. 426—535 **2 Claims**



1. A process for augmenting or enhancing the fruity aroma or taste of a foodstuff which comprises adding thereto from about 0.02 ppm up to about 50 ppm by weight of said foodstuff of 3-mercapto-2,6-dimethyl-4-heptanone.

4,024,290

BULKING AGENT FOR FOODS

Roger M. Layton, Buffalo Grove, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 22, 1976, Ser. No. 668,759

Int. Cl.² A23L *1/09*, *1/236*

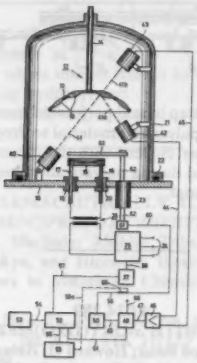
U.S. Cl. 426—548 **8 Claims**

1. A bulking agent suitable for incorporation into formulated foods, wherein formulated foods containing the bulking agent have approximately the texture, moisture retention capability, appearance, and density of formulated foods containing the same percent by weight of sucrose; said bulking agent prepared by the process of reacting at 120°–200° C under reduced pressure 1–1.2 parts of glucose with about 1 part of sorbitol in the presence of 0.01–0.2 parts of an acid ion exchange resin for 30–360 minutes, dissolving the reaction product in water, neutralizing the resulting solution, separating the acid-ion exchange resin, removing water and cooling until the bulking agent becomes viscous and forms a glass.

4,024,291
CONTROL OF VAPOR DEPOSITION

Ingo Wilmanns, Geisdorf, Germany, assignor to Leybold-Heraeus GmbH & Co. KG, Cologne, Germany

Continuation of Ser. No. 587,501, June 17, 1975, abandoned. This application Sept. 21, 1976, Ser. No. 728,833
Int. Cl.² C23C 13/04
U.S. Cl. 427—10 4 Claims



1. A method for regulating the vapor deposited layer buildup in the production of deposited optically active thin layers on substrates in a vacuum comprising the steps of: measuring continuously the optical characteristics of the deposited layer; converting the optical characteristics into proportional electrical signals; differentiating said signals twice to obtain the second derivative; deriving the zero-axis crossings of said signals from said second derivative; and interrupting the deposition of said layers dependent on said zero-axis crossing, whereby a first of the differentiating signals controls the buildup of λ/4 layers and a second of the differentiating signals controls the buildup of the λ/8 layers.

4,024,292
PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK

Chin H. Lu, Webster, and David A. Allen, Sodus, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 374,159, June 27, 1973, Pat. No. 3,954,640. This application Sept. 24, 1975, Ser. No. 616,809
Int. Cl.² G03G 9/12
U.S. Cl. 427—17 9 Claims

1. A process for developing latent electrostatic images on a substrate comprising contacting the surface of the substrate containing the latent electrostatic image with a composition containing about 3–20 weight percent colorant agent, about 25–90 weight percent inert, non-volatile, high boiling organic carrier, about 3–35 weight percent organic resin having a glass transition temperature of about ambient temperature or below, said resin having a particle size of 5 microns or less dispersed in and insoluble in said carrier, and 0 to about 25 percent dispersing agent.

4,024,293
HIGH SENSITIVITY RESIST SYSTEM FOR LIFT-OFF METALLIZATION

Michael Hatzakis, Ossining, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,551
Int. Cl.² B05D 3/06
U.S. Cl. 427—43 19 Claims

1. A high sensitivity electron resist system for lift-off metallization comprising at least two resist layers coated on a substrate, each of said layers being a radiation degradable organic polymer with each layer being developable by different solvents, which solvents being separably capable of dissolving of one said resist layers but not the other.

4,024,294
PROTECTIVE COATINGS FOR SUPERALLOYS

John R. Rairden, III, Niskayuna, N.Y., assignor to General Electric Company, Schenectady, N.Y.

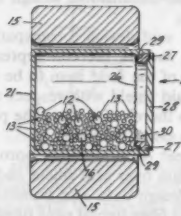
Continuation of Ser. No. 392,548, Aug. 29, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,727
Int. Cl.² C23C 13/02
U.S. Cl. 427—42 15 Claims

1. A method of improving the high temperature oxidation and corrosion resistance of a nickel-base or cobalt-base superalloy containing 9.5–19.0 percent chromium comprising coating said superalloy by physical vapor deposition with a composition consisting of, on a weight percent basis, from 50% cobalt and 50% chromium to 80% cobalt and 20% chromium.

4,024,295
COATING PROCESS UTILIZING PROPELLED PARTICLES

Curtis L. Chase, Oakdale, and William R. Lovness, West St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 7, 1975, Ser. No. 565,712
Int. Cl.² B05D 3/14, 7/00
U.S. Cl. 427—47 5 Claims



1. In a process for coating particulate material upon the surface of a solid substrate comprising:

exposing said substrate surface in a confined volume containing impact media in the form of a small permanent magnetic elements and said particulate material, and

propelling said impact media by a magnetic field which varies in direction with time at a velocity sufficient to cause the particulate material to impinge upon and to coat said exposed substrate surface;

the improvement which comprises physically removing at least 10% the relative weight of coated impact media fragments normally produced without said improvement during said coating by having in effective communication with said confined volume a perforated element which has openings of a size sufficient to receive impact media fragments and to exclude said impact media and said particular material.

4,024,296
PHOTOCATALYST SYSTEM AND PIGMENTED ACTINIC LIGHT POLYMERIZABLE COATING COMPOSITIONS CONTAINING THE SAME

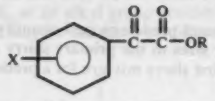
Gerald W. Gruber, Sewickley, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 2, 1976, Ser. No. 654,499
Int. Cl.² B05D 3/06
U.S. Cl. 427—53 27 Claims

1. A photocatalyst system comprising

a. at least one aromatic ketone photopolymerization activator having a triplet energy in the range of from about 54

kilocalories per mole to about 72 kilocalories per mole, wherein said photopolymerization activator is represented by the formula:



wherein

R is hydrogen, alkyl containing from one to about twenty-two carbon atoms, benzyl, phenyl, hydroxyalkyl containing from 1 to about 10 carbon atoms, chloroalkyl containing from 1 to about 10 carbon atoms, bromoalkyl containing from 1 to about 10 carbon atoms, alkoxyalkyl where the alkoxy portion contains from 1 to about 4 carbon atoms and where the alkyl portion contains from 1 to about 10 carbon atoms, phenoxyalkyl where the alkyl portion contains from 1 to about 10 carbon atoms;

X is hydrogen, halo, alkoxy containing from 1 to about 4 carbon atoms or alkyl containing from 1 to about 4 carbon atoms;

b. phenanthrenequinone.

14. A method comprising:

a. coating a substrate with an actinic light polymerizable coating composition comprising:

1. at least one aromatic ketone photopolymerization activator having a triplet energy in the range of from about 54 kilocalories per mole to about 72 kilocalories per mole,
2. phenanthrenequinone,
3. organic polymerizable material containing a plurality of sites of ethylenic unsaturation and capable of being free radically addition polymerized by interaction with said aromatic ketone photopolymerization activator and said phenanthrenequinone upon exposure to actinic light, said organic polymerizable material comprising ethylenically unsaturated polyester containing a plurality of sites of ethylenic unsaturation, polymer having a plurality of sites of acrylic unsaturation, monomer having a plurality of sites of acrylic unsaturation or mixture thereof; and
4. ultraviolet light absorbing hiding pigment; and

b. exposing said coated substrate to actinic light of the first kind and to actinic light of the second kind, said actinic light of the first kind

1. having a wavelength in the ultraviolet region of the spectrum such that said ultraviolet light absorbing hiding pigment is substantially opaque thereto, and
2. being absorbable by said photopolymerization activator to produce free radicals capable of causing polymerization of acrylic groups,

said actinic light of the second kind

3. having a wavelength longer than that of said actinic light of the first kind and such that said ultraviolet light absorbing pigment is substantially transparent thereto, and
4. being absorbable by said phenanthrenequinone to produce free radicals capable of causing polymerization of acrylic groups

to thereby polymerize said coating into a hard, infusible film throughout its thickness.

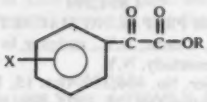
4,024,297
ACTINIC LIGHT POLYMERIZABLE COATING COMPOSITIONS

Gerald W. Gruber, Sewickley, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 2, 1976, Ser. No. 654,500
Int. Cl.² B05D *3/06*
U.S. Cl. 427—54 **19 Claims**

1. An actinic light polymerizable composition comprising:

a. at least one photopolymerization activator represented by the formula:



wherein

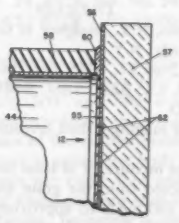
1. R is hydrogen, alkyl containing from one to about twenty-two carbon atoms, benzyl, phenyl, hydroxyalkyl containing from one to about ten carbon atoms, chloroalkyl containing from one to about ten carbon atoms, bromoalkyl containing from one to about ten carbon atoms, alkoxyalkyl where the alkoxy portion contains from one to about four carbon atoms and where the alkyl portion contains from one to about ten carbon atoms, or phenoxyalkyl where the alkyl portion contains from one to about ten carbon atoms; and
2. X is hydrogen, halo, alkoxy containing from one to about four carbon atoms or alkyl containing from one to about four carbon atoms; and

b. organic polymerizable material containing a plurality of sites of ethylenic unsaturation and capable of being free radically addition polymerized by interaction with said photopolymerization activator upon exposure to actinic light, said organic polymerizable material comprising ethylenically unsaturated polyester containing a plurality of sites of ethylenic unsaturation, polymer having a plurality of sites of acrylic unsaturation, monomer having a plurality of sites of acrylic unsaturation or a mixture thereof.

4,024,298
METHOD OF PROVIDING STORAGE DIELECTRIC OF PHOSPHOR PARTICLES COATED WITH SECONDARY EMISSIVE MATERIAL

Ralph Allen Mossman, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Division of Ser. No. 458,947, April 8, 1974, Pat. No. 3,982,150, which is a division of Ser. No. 37,378, May 7, 1970, Pat. No. 3,862,450, which is a continuation of Ser. No. 618,129, Feb. 23, 1967, abandoned. This application Apr. 19, 1976, Ser. No. 677,936
Int. Cl.² H01J *29/39*, *29/10*
U.S. Cl. 427—64 **8 Claims**



1. A method of manufacture of a charge image storage

dielectric capable of bistable storage of a charge image formed thereon, comprising the steps of:

coating a plurality of particles of phosphor material with a secondary emissive-forming substance; and

heating the coated phosphor particles to form a secondary electron emissive material from said substance and to bond said secondary emissive material to the outer surface of said phosphor particles whereby a storage dielectric is formed with said secondary emissive material being substantially uniformly distributed throughout said storage dielectric.

4,024,299

PROCESS FOR PREPARING MAGNETIC MEMBER

John G. Smeggil, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 406,310, Oct. 15, 1973, abandoned. This application Oct. 28, 1975, Ser. No. 625,829

Int. Cl.² H01F *10/02*

U.S. Cl. 427—130 **6 Claims**

1. A process of preparing a magnetic member consisting essentially of a non-magnetic solid substrate carrying a magnetically anisotropic film consisting of a transition metal-rare earth alloy which comprises providing a non-magnetic solid substrate, providing a rare earth metal compound wherein the rare earth metal component is seleted from the group consisting of the 15 elements of the lanthanide series having atomic numbers 57 to 71 and the element yttrium and which is decomposible at a temperature below 1000°C at atmospheric pressure to yield the rare earth metal vapor, heating said rare earth metal compound to decompose it and yield the rare earth metal vapor, contacting the resulting rare earth metal vapor with said substrate to deposit a substantially uniform continuous layer of rare earth metal thereon, providing a transition metal compound wherein the transition metal component is selected from the group consisting of cobalt, iron, nickel, manganese and alloys thereof and which is decomposible at a temperature below 1000°C at atmospheric pressure to yield the transition metal vapor, heating said transition metal compound to decompose it and yield the transition metal vapor, contacting the resulting transition metal vapor with said deposited layer of rare earth metal to deposit substantially coextensively a substantially uniform continuous layer of the transition metal thereon, said substrate being substantially inert to the conditions of deposition, said process being carried out in an atmosphere in which metal compounds and said metals are inert, heating said layers forming a continuous coherent substantially uniform alloy film thereof, the thickness of said deposited layers of metal being dependent on the amount desired in said alloy film, said alloy film ranging in thickness from about 100 Angstroms to about 10,000 Angstroms, said alloy film having its easy axis of magnetization significantly aligned perpendicular to the plane of the substrate, and applying a magnetic field to said alloy film parallel to said easy axis which has a magnitude that saturates the film.

4,024,300

PROCESS FOR MAKING AN INVESTMENT MOLD FOR CASTING AND SOLIDIFICATION OF SUPERALLOYS THEREIN

Paul S. Svec, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 27, 1975, Ser. No. 590,970

Int. Cl.² B29C *1/04*; **B44D** *1/20*

U.S. Cl. 427—133 **21 Claims**

1. A process for making a shell investment mold comprising the steps of

preparing a first mixture of at least two flour sizes of fused alumina selected from the grain size range of from approximately 240 mesh to approximately 400 mesh, U.S. Sieve Series, the fused alumina being acid washed to remove impurities;

b. adding a first predetermined quantity of the mixture of flours to a predetermined quantity of colloidal silica binder to form a primary slurry mixture, wherein the weight percent of silica in the binder is from 15 percent to 36 percent and the primary slurry mixture comprises from about 65 percent fused alumina flour mixture to about 73 percent fused alumina flour mixture, balance silica binder material;

c. mixing together the first mixture of flours and the binder until the viscosity of the primary slurry mixture becomes stabilized;

d. adding a second predetermined quantity of the first mixture of flour sizes to the primary slurry mixture;

e. mixing the first slurry mixture for a predetermined period of time;

f. adjusting the specific gravity of the primary slurry mixture, from about 2.36 to about 2.42;

g. adjusting the viscosity of the primary slurry mixture, from about 7 to about 10 seconds as measured with a No. 5 Zahn cup;

h. adding a predetermined volume of a wetting agent, as required, to the primary slurry mixture;

i. adding a predetermined weight of a defoaming agent, as required, to the primary slurry mixture;

j. mixing the primary slurry mixture and the additions, as required, for a predetermined period of time;

k. applying a coating layer of the primary slurry mixture to the wax pattern;

l. graining the coated pattern with a first grain coating material comprising fused alumina of a first preselected grain size;

m. repeating process steps (k) and (l) as often as required to form a plurality of alternate layers of primary slurry mixture and grain coating material;

n. preparing a secondary slurry mixture comprising fused alumina and a colloidal silica binder;

o. applying a coating layer of the secondary slurry mixture to the coated pattern;

p. graining the coated pattern with a second grain coating material of fused aluminum of second preselected grain size, and

q. repeating process steps (o)and (p) as often as required to form a plurality of alternate layers of secondary slurry mixture and second grain coating material.

4,024,301

INTERNALLY COATED REACTION VESSEL FOR USE IN OLEFINIC POLYMERIZATION

Donald E. Witenhafer, North Olmsted; James B. Haehn, and Louis Cohen, both of Avon Lake, all of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

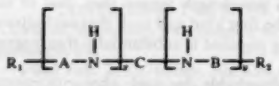
Filed May 2, 1975, Ser. No. 574,037

Int. Cl.² B05D *7/22*; **C08F** *114/00*

U.S. Cl. 427—230 **25 Claims**

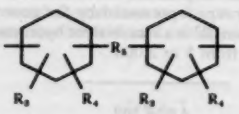
1. A process for substantially eliminating the build-up of polymers on the internal surfaces of a polymerization reaction vessel which comprises applying to said surfaces a coating solution comprised of a straight chain or branched polyaromatic amine having a molecular weight greater than about 250 and having at least 2 —OH groups per 1000 molecular weight dissolved in an aqueous alkali metal hydroxide solution, said polyaromatic amine having the structure selected from the group consisting of

I.



wherein (1) A, B, and C are selected from the group consisting of

(a)

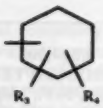


wherein R_3 is —H, halogen, or an alkyl group containing from 1 to 8 carbon atoms and may be the same or different; R_4 is —H, —OH, $-NH_2$ or an alkyl group containing from 1 to 8 carbon atoms and may be the same or different; and R_5 is

or a straight chain or branched alkylene or alkylidene group containing from 1 to 5 carbon atoms; and

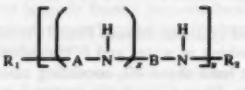
(b)

wherein R_3 and R_4 are the same as for (a); and wherein A, B, and C may be the same or different and each repeating unit may be the same or different; (2) R_1 and R_2 are either —H, —OH, $-NH_2$, or

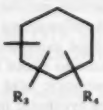


and may be the same or different and wherein R_3 and R_4 are the same as for (a); and (3) x is an integer from 1 to 20 and y is an integer from 0 to 20; and

II.



wherein (4) A, B, R_1, R_2, R_4 and R_5 are the same as in I and R_3 is —H, or



as defined in (2); and (5) x is an integer from 1 to 4 and y is an integer from 1 to 15.

4,024,302

METHOD FOR COATING RUNNING WEBS HAVING PROJECTING SPLICES

Akira Takagi; Sei Kawahara, both of Fujimiya, and Hideo Takeda, Minami-ashigara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

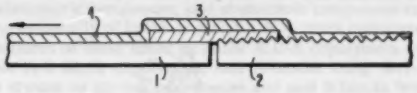
Filed Aug. 22, 1974, Ser. No. 499,678

Claims priority, application Japan, Aug. 22, 1973, 48-94194

Int. Cl.² B05D *3/12*

U.S. Cl. 427—290 **7 Claims**

1. In a method for continuously coating with a coating solution a running web having projecting discontinuous areas in the surface thereof, wherein said web comprises a plurality of webs connected end to end in series with splicing tapes which produce said discontinuous areas, the improvement comprising coarsening the surface of the web to be coated at



least in the area of the succeeding webs immediately following the trailing edge of each splicing tape, thereby preventing unevenness in the coating caused by said discontinuous areas.

4,024,303

METHOD OF APPLYING A FIRMLY ADHERENT METALLIC COATING TO TITANIUM AND TITANIUM ALLOY

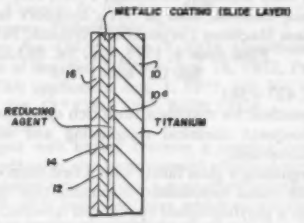
Hans-Jürgen Hahn, Hamburg, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Germany

Filed Sept. 2, 1975, Ser. No. 609,522

Claims priority, application Germany, Sept. 6, 1974, 2442742

Int. Cl.² C23C *7/00*

U.S. Cl. 427—295 **10 Claims**



1. A method of facing a constructional part made of a titanium and/or titanium alloy with a metal coating, comprising subjecting the surface of the titanium or titanium alloy to a reducing agent to form a clean oxide free titanium surface having a protective film thereon, spraying an intermediate layer of nickel over the protective film so as to effect a diffusion of the nickel into the protective film and the surface of the constructional part, and thereafter applying the metal coating over the intermediate layer of nickel.

4,024,304

METHOD OF FINISHING THE SURFACE OF A POROUS BODY

George E. Smock, Heath; Gregory C. Brock, Jr., Granville; Homer G. Hill, Newark, and Kenneth L. Austin, Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Mar. 24, 1975, Ser. No. 561,565

Int. Cl.² B32B *7/10, 19/06*

U.S. Cl. 427—316 **3 Claims**

1. A method of producing a surface design in a porous body comprising: molding a porous plastic body at a temperature between approximately 300° and 700° F against a surface containing a desired surface design to produce a porous body having a porous surface of the desired finished configuration but which is too porous to paint, the body having a density from 30 to 100 pounds per cubic foot and molded from a molding compound of hammermilled glass fibers and a thermosetting phenolic binder, preparing a dispersion of inert particles in a heat-thinnable, organic binder-forming material, the particles being of a size to become wedged in the pores of

the finished configured surface, contacting the finished configured surface with the dispersion by immersing the molded body in the dispersion while the molded body still has heat from the molding operation, draining excess dispersion from the surface, and controlling the time of contact so that the

penetration is at such a state that the pores of the surface are essentially filled while any undrained excess on the surface continues to penetrate the surface to a degree where the remaining dispersion does not change the desired configuration of the surface.

4,024,305

METHOD FOR PRODUCING A RESIN RICH EPOXY PREPREG AND LAMINATE

Warren Alan Alpaugh, Chenango Forks, and William Joseph Summa, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 4, 1975, Ser. No. 583,830

Int. Cl.² B05D *1/38*

U.S. Cl. 427—381 **7 Claims**

1. A method for making a resin rich epoxy prepreg suitable for subsequent chemical roughening and additive plating which comprises:

impregnating a glass fabric with a first resin of a dicyandiamide cured brominated bisphenol type epoxy modified with a polyfunctional epoxidized novolac;

curing said first resin impregnation to 80–85% of complete cure;

coating the impregnated fabric with a second dicyandiamide cured epoxy resin selected from the group of epoxy resins consisting of (1) bisphenol A type, (2) brominated bisphenol A and (3) polyester modified bisphenol A; and

curing said coating of second resin to 80–85% of complete cure.

4,024,306

METHOD OF PREPARING AN ORGANOPOLYSILOXANE FOR SURFACE COATING

Minoru Takamizawa; Akira Abe; Yoshio Inoue, and Hiroshi Yoshioka, all of Annaka, Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed Mar. 19, 1975, Ser. No. 560,101

Claims priority, application Japan, Mar. 25, 1974, 49-33211

Int. Cl.² B32B *9/04;* **C08G** *77/04*

U.S. Cl. 427—387 **17 Claims**

1. A method for the preparation of an organopolysiloxane which comprises partial co-hydrolysis and co-condensation, in the presence of an acid catalyst, of a mixture comprising (a) from 40 to 92% by weight of an organotrialkoxysilane represented by the general formula $R^1Si(OR^2)_3$ where R^1 is a monovalent hydrocarbon groups and R^2 is an alkyl group or a combination of said organotrialkoxysilane with a tetraalkoxysilane represented by the general formula $Si(OR^3)_4$ where R^3 is an alkyl group, (b) from 5 to 40% by weight of a fluoroalkylalkoxysilane represented by the general formula $R^4CH_2CH_2Si(R^5)_a(OR^6)_{3-a}$ where R^4 is a perfluoroalkyl group, R^5 is a monovalent hydrocarbon group, R^6 is an alkyl group and a is an integer of 0, 1 or 2, and (c) from 3 to 20% by weight of a diorganopolysiloxane terminated at both chain ends with silanolic hydroxy groups represented by the general formula $HO\text{-}R_2^7Si\text{-}O)_nH$ where R^7 is a monovalent hydrocarbon group and n is an integer from 5 to 2,000.

4,024,307

POLYURETHANE SOLUTIONS

Helmut Brahm, and Helmut Schulze, both of Erlenbach, Germany, assignors to Akzo N.V., Arnhem, Netherlands

Filed Feb. 24, 1975, Ser. No. 552,062

Claims priority, application Germany, Mar. 1, 1974, 2409789

Int. Cl.² B32B *7/00;* **C08K** *5/17*

U.S. Cl. 428—262 **30 Claims**

1. In a process for the production of polyurethane solutions by reaction of hydroxy compounds with diisocyanates in a solvent consisting essentially of dimethylformamide, the improvement which comprises:

concurrently reacting (a) one mol of a polyester or polyether having hydroxy end groups and a molecular weight of about 800 to 4000 and (b) 1.2 to 9 mols of an aliphatic glycol of 2 to 9 carbon atoms in said dimethylformamide together with (c) a diisocyanate at a temperature of about 80° C. to 110° C., the reaction being carried out at a concentration in the solvent of about 25 to 45% by weight of the initial reactants;

maintaining a molar ratio of NCO-groups to OH-groups of about 1 ± 0.08 during the reaction; and

stopping the reaction after reaching a viscosity of about 200 to 3500 poise, measured at 20° C., by addition of a monovalent alcohol.

4,024,308

DURABLY FLAME PROOFED TEXTILE MATERIALS

George T. Miller, Lewiston, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 527,105, Nov. 25, 1974, abandoned, which is a continuation of Ser. No. 307,327, Nov. 16, 1972, abandoned. This application Dec. 22, 1975, Ser. No. 642,888

Int. Cl.² B32B *27/00;* **D02G** *3/00*

U.S. Cl. 428—290 **13 Claims**

1. A flameproofed synthetic fibrous flexible textile material which is fast to washing in water and is characterized by an Oxygen Index of at least about 40, consisting essentially of a normally flammable, fibrous, synthetic material, which material is selected from the group consisting of polypropylene, poly(hexamethyleneadipamide), polycaproamide and poly(m-phenyleneisophthalamide), and a flame-retardant amount of the cured reaction product of a phosphoric acid and an epoxy resin capable of reacting with phosphoric acid to form a phospho-hydrin type compound, the amount of the epoxy resin being about one to about three moles per mole of phosphoric acid the phosphoric acid having been intimately admixed with said fibrous synthetic material prior to contact with the epoxy resin and the epoxy resin having been exclusively reacted in situ with the phosphoric acid after the phosphoric acid was admixed with the fibrous synthetic material.

4,024,309

FOAM GLASS STRUCTURAL ELEMENT AND METHOD OF PRODUCING

David R. Pender, Columbia, S.C., assignor to Ronald P. Wilder, Columbia, S.C.

Filed Mar. 17, 1975, Ser. No. 559,047

Int. Cl.² B32B *3/26*

U.S. Cl. 428—312 **6 Claims**

1. A method of continouously casting a structural load bearing member comprising feeding molten glass foam downwardly from a source on a substantially vertical path within a vacuum chamber where a substantially constant vacuum is

maintained, simultaneously feeding molten metal coated pretensioned metal sheets downwardly on said vertical path in said vacuum chamber with said coated metal sheets in contact

with the molten glass foam to form bonded prestressed skins on said structural load bearing member, and cooling the resulting composite product to solidify the molten glass foam.

6. The product resulting from the method in claim 1.

4,024,310

LAMINATES

Alan Metcalf Wooler, and Dennis Charlton Allport, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 18, 1975, Ser. No. 605,505

Claims priority, application United Kingdom, Oct. 8, 1974, 43511/74

Int. Cl.² B32B 5/20

U.S. Cl. 428—313 8 Claims

1. A laminated panel comprising a core of rigid isocyanurate-based foam sandwiched between two facing sheets, characterized in that at least one of the facing sheets has an adherent layer of intumescent material applied to its inner surface and in that there is embedded in one or both outer surfaces of the foam core a wire mesh binding material such that it touches one or both inner surfaces of the facing sheets; the whole being bonded together by the foam core into a unitary construction.

2. A laminated panel as claimed in 1 wherein at least one facing sheet is made from a non-combustible material.

8. A laminated panel as claimed in claim 1 wherein the wire mesh is chicken wire.

4,024,311

ELECTROCONDUCTIVE PAPER COATING

Donald M. MacDonald, Monroe, and Lee H. Deed, Nyack, both of N.Y., assignors to International Paper Company, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,261

Int. Cl.² B32B 27/10, 27/38

U.S. Cl. 428—342 16 Claims

1. An electroconductive product suitable for electrographic image reproduction comprising a substrate having on at least a portion of a surface thereof a coating comprising the reaction products of a tertiary amine and monomeric epichlorohydrin reacted in a mole ratio of 1 to 2:1 and at a temperature of at least about 70° C up to about 100° C.

4,024,312

PRESSURE-SENSITIVE ADHESIVE TAPE HAVING EXTENSIBLE AND ELASTIC BACKING COMPOSED OF A BLOCK COPOLYMER

Ralf Korpman, Bridgewater, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed June 23, 1976, Ser. No. 699,101

Int. Cl.² A61L 15/00; C09J 7/02

U.S. Cl. 428—343 5 Claims

1. A highly conformable adhesive tape which comprises a highly extensible and elastic backing film and a normally tacky and pressure-sensitive elastomeric adhesive layer on at least one pf the major surfaces of the film; and film being formed from an elastomeric and thermoplastic film forming composition which comprises an elastomeric component and 0–200 parts of a resin component per one hundred parts by weight of the elastomeric component, said elastomeric component consisting essentially of linear or radial A-B-A block copolymers or mixtures of these linear or radial A-B-A copolymers with simple A-B block copolymers, said A-blocks being derived from styrene or styrene homologues and said B-blocks being derived from conjugated dienes or lower alkenes, said resin component consisting essentially of low molecular weight resins adapted to associate principally with the thermoplastic A-blocks of said block copolymers; and said film possessing:

a. a lengthwise elongation to break of at least about 200 percent,

b. a rubber modulus of not above about 2,000 pounds per square inch, and

c. an elastic recovery from 50 percent stretch of at least about 75 percent,

whereby the tape normally may be removed easily by stretching it lengthwise to separate the adhesive from the application surface.

4,024,313

PAPER WEB COATED WITH AN ALL-LATEX ADHESIVE COATING COMPOSITION

Philo Burton Cressey, Jr., Gorham, Maine, assignor to Scott Paper Company, Philadelphia, Pa.

Division of Ser. No. 439,955, Feb. 5, 1974, abandoned, which is a division of Ser. No. 218,012, Jan. 14, 1972, Pat. No. 3,832,216. This application Aug. 1, 1975, Ser. No. 601,202

Int. Cl.² C09J 7/02; B32B 23/08

U.S. Cl. 428—355 2 Claims

1. In a paper web having thereon a coating comprising pigment and adhesive, the improvement which comprises the adhesive consisting essentially of a mixture of latices comprising 50 to 98% of at least one latex which is not capable of being swelled or rendered soluble by alkali and 2 to 50% of at least one latex which is capable of being swelled or rendered soluble by alkali, the latex capable of being swelled or rendered soluble remaining in an unswelled or undissolved condition.

4,024,314

ELECTRICAL CONDUCTOR INSULATED BY A POLYKETONES

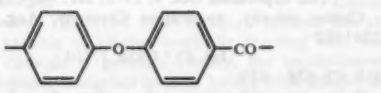
Klaus J. Dahl, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 451,521, March 15, 1974, Pat. No. 3,953,400, which is a continuation-in-part of Ser. No. 218,465, Jan. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 115,824, Feb. 16, 1971, abandoned. This application Dec. 22, 1975, Ser. No. 643,187

Int. Cl.² H01B 3/30

U.S. Cl. 428—379 2 Claims

1. An electrical conductor bearing an insulative coating of a thermally cross-linked crystalline melt-processing polymer consisting essentially of repeating units of formula

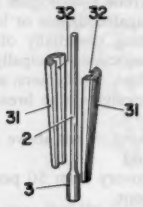


having a mean inherent viscosity within the range from about 0.8 to about 1.65 and elongation of at least about 50%.

4,024,315
ARTIFICIAL HAIR FOR IMPLANTING IN HUMAN TISSUE

Shiro Yamada, No. 31-8, Koboyama, Kobo-cho, Chiryu, Aichi, Japan

Division of Ser. No. 581,961, May 28, 1975, abandoned. This application Jan. 16, 1976, Ser. No. 649,599
Int. Cl.² B32B *27/00*; D02G *3/00*
U.S. Cl. 428—399 6 Claims

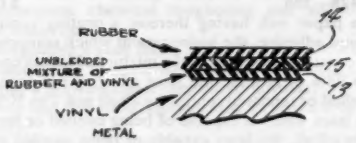


1. An artificial hair consisting of a monofilament of 0.06 to 0.10 mm in diameter selected from the group consisting of nylon and polyacrylonitrile resin, said artificial hair having an elongated root formed at one end, said root having a diameter of 0.13 to 0.20 mm and a length of 1.0 to 2.0 mm.

4,024,316
INSULATED SAFETYSIZED EQUIPMENT

Joe Loris, Box 1202, Mansfield, Ohio 44903

Filed Jan. 22, 1976, Ser. No. 651,341
Int. Cl.² B32B *25/08*, *25/18*, *27/30*
U.S. Cl. 428—409 1 Claim



1. Insulated Safetysized Equipment, comprising in combination, an equipment such as a ladder, crane, hoist, lift, chain, steel rope, shovel, scaffolding, or the like, said equipment being of metal and having its outer surface covered with a coating of electrical insulated material, said material comprising a transparent, clear layer in which there is an outer film of non-slip rubber, an inner film of vinyl resin, and an unmixed film of non-slip rubber and vinyl resin therebetween; and a layer of clear lucite acrylic resin being between said equipment metal surface and said transparent clear layer, said lucite acrylic resin having a sandblasted, roughened outer surface.

4,024,317
PROCESS FOR COATING PRETREATED VULCANIZED ARTICLES OF SATURATED OR UNSATURATED POLYOLEFIN RUBBER

Dieter Stoye, Marl; Werner Andrejewski, Gahlen, and Adolf Dräxler, Marl, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Continuation of Ser. No. 390,251, Aug. 21, 1973, abandoned. This application Oct. 9, 1975, Ser. No. 621,167
Claims priority, application Germany, Aug. 23, 1972, 2241413
Int. Cl.² B32B *27/40*
U.S. Cl. 428—423 9 Claims

1. In a process for coating the surface of a vulcanized polyolefin rubber pretreated with chromosulfuric acid and curing the resultant coating, the improvement which comprises coating said surface with a varnish coating material consisting essentially of:

a. a saturated oligoester resin dissolved in an inert solvent, said resin having a molecular weight of 250–3,500 and an alcohol component which is at least difunctional, contains free hydroxyl groups and consists essentially of 20–100 mole percent 1,4-bis(hydroxymethyl)cyclohexane, the acid component of said resin being a mixture of at least one aromatic or cycloaliphatic dicarboxylic acid with an aliphatic dicarboxylic acid in a molar ratio of 1–3 moles of cyclic dicarboxylic acid per mole of aliphatic dicarboxylic acid; and

b. a di- or poly-functional isocyanate or mixture thereof, wherein the ratio of the isocyanate groups to the free hydroxyl groups of the oligoester resin is 0.75:1 to 1:1,

to form a polyolefin rubber coated with a varnish having xylene resistance, good adhesive strength, high elasticity and excellent surface hardness.

4,024,318
METAL-FILLED PLASTIC MATERIAL

Eric O. Forster, Scotch Plains, and Byron M. Vanderbilt, Westfield, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

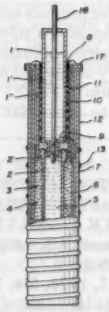
Filed Feb. 17, 1966, Ser. No. 528,080
Int. Cl.² B32B *5/16*
U.S. Cl. 428—519 21 Claims

1. A filled plastic material composition suitable for use as a radar shield comprising (1) a first layer of filled plastic comprising about 40 to about 93 weight percent of filler particles and about 7 to about 60% by weight of a hydrocarbon thermosetting plastic wherein said filler particles are metals selected from the group consisting of aluminum, iridium, tin, lead, bismuth, elements from Group IIB to Group VIIB of the Periodic Table of the Elements and mixtures thereof and (2) a second layer of filled plastic superimposed on said first layer said second layer comprising about 40 to about 93 weight percent of filler particles and about 7 to about 60% by weight of a hydrocarbon thermosetting plastic wherein said filler particles are oxides of metals selected from the group consisting of aluminum, iridium, tin, lead, bismuth, elements from Group IIB to Group VIIB of the Periodic Table of the Elements and mixtures thereof.

4,024,319
SODIUM-SULFUR STORAGE BATTERY

Hiroshi Kagawa, Takatsuki, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Sept. 15, 1975, Ser. No. 613,222
Claims priority, application Japan, Oct. 8, 1974, 49-115235
Int. Cl.² H01M *4/36*
U.S. Cl. 429—104 1 Claim



1. A sodium-sulfur storage battery comprising

a double-walled sodium reservoir (1), made of metal, having an inner wall (1′) and an outer wall (1″) said inner and outer walls being electrically insulated from each other,

said inner wall (1′) having an upper part and a lower part which upper part has a diameter larger than that of said lower part to provide an annular space;

an electric heater (10) between the double walls of said reservoir and insulated from both of said walls by a heat-resisting insulator (11), the windings of the heater being relatively closer together adjacent the upper part, and relatively farther apart adjacent the lower part, of said reservoir with the winding pitch thereof changed gradually and smoothly between them;

an annular solid electrolyte (2) in communication with said reservoir through the narrowed inner wall (1′), said electrolyte being formed into a thickened wall (2′) at a joint (9) with said reservoir and mounted on the top of solid electrolyte (2), the outer diameter of said electrolyte gradually increasing to form thickened part (2′) at the upper part thereof,

said thickened part being received in an annular groove of an insulating ring (14);

said thickened part (2′) and the bottom end of said reservoir being secured together by solder glass (15);

sodium as anodic reactant (5) contained in said reservoir and said electrolyte;

sulfur or sodium polysulfide as cathodic reactant (4) contained about the solid electrolyte (2) the level of which reactant is no higher than said joint (9),

said cathodic reactant being infiltrated in carbon felt (3) as electrical conductor, outside of which is fastened by cathodic collector (6), connected to cathodic terminal (17) at its upper part;

a battery housing (7) which contains the above-mentioned components and is sealed at the upper part thereof;

an anodic terminal (16) disposed centrally in the sodium reservoir, the upper part of which terminal passes through the top part of said reservoir and is sealed therein and the lower end of which terminal passes through the bottom of said inner wall and enters into the solid electrolyte; and

an outside heater (13) surrounding the battery housing (7) below the level of cathodic reactant (4).

4,024,320
GALVANIC CELLS

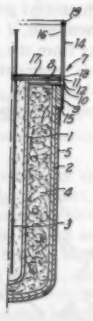
John George Gibson, Whatstandwell, and James Lowe Sudworth, Burton-on-Trent, both of England, assignors to Chloride Silent Power Ltd., London, England

Filed Dec. 15, 1975, Ser. No. 641,111

Claims priority, application United Kingdom, Jan. 10, 1975, 1149/75

Int. Cl.² H01M 6/18

U.S. Cl. 429—104 **24 Claims**



1. A galvanic cell in which the electrochemical reactants are alkali-metal as the anode active material and sulphur material as the cathode active material, an anode compartment, a cathode compartment, said anode and cathode compartments being separated by a solid electrolyte which is an alkali metal ion conductor, current collecting poles associated with the anode and cathode compartments, the current collecting pole associated with the cathode compartment comprising a first layer of an electronically conducting material which is resistant to the corrosive action of sulphur and alkali metal polysulphides and which defines a continuous surface in contact with the sulphur and alkali metal polysulphides and a second layer of a higher electronically conducting material in electrical contact with said first layer over the surface of the latter remote from the sulphur and alkali metal polysulphides.

4,024,321
ALKALI METAL-SULPHUR CELLS

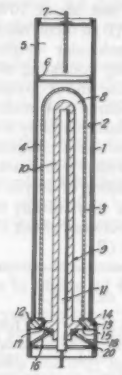
Alec R. Tilley, Blackbrook, near Belper, England, assignor to Chloride Silent Power Limited, London, England

Filed June 28, 1976, Ser. No. 700,263

Claims priority, application United Kingdom, July 3, 1975, 28096/75

Int. Cl.² H01M 2/00

U.S. Cl. 429—104 **5 Claims**



1. An alkali metal-sulphur cell in which the anode compartment is defined by the space between an outer tubular member and an inner tubular member constituting the solid electrolyte of the cell, the cathode compartment is defined by the interior of the inner tubular member and a current collecting pole extends into the cathode compartment, wherein the outer tubular member, the inner tubular member and the current collecting pole have shoulder formations which abut one another through sealing means and are urged towards one another by spring means acting in the axial direction of the tubular member.

4,024,322
BATTERY WITH SILICON METAL ANODES

James P. McKaveney, Claremont, Calif., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Mar. 24, 1975, Ser. No. 561,144

Int. Cl.² H01M 6/04

U.S. Cl. 429—201 **7 Claims**

1. In a battery comprised of an anode, a cathode and an electrolyte capable of electrochemically reacting with the anode and cathode to generate current, the improvement wherein the anode comprises an alloy having from about 1 to about 65 percent silicon by weight of alloy, and from about 1 to about 85 percent by weight of alloy, of a highly active metal selected from the group consisting of barium, magnesium, calcium, cerium, lanthanum, strontium, and mixtures thereof.

4,024,323
BATTERY SEPARATOR

Willem Martin Versteegh, Palo Alto, Calif., assignor to Evans Products Company, Portland, Oreg.

Continuation of Ser. No. 547,376, Feb. 6, 1975, abandoned. This application Apr. 19, 1976, Ser. No. 678,411

Int. Cl.² H01M *2/16*

U.S. Cl. 429—249 **6 Claims**

1. A battery separator comprising a microporous sheet of a size and configuration adapted to fit between and separate the plates of a battery, said sheet consisting essentially of a mixture of two polymeric constituents, a plasticizer and a siliceous filler;

the first of said polymeric constituents in said mixture being a polyolefin homopolymer selected from the group consisting of polyethylene, polypropylene and mixtures thereof, said polyolefin homopolymer having an intrinsic viscosity greater than 3.0 and a standard load melt index of less than 0.04 g. per 10 minutes;

the second of said polymeric constituents in said mixture being selected from the group consisting of (A) a copolymer of an olefin selected from the group consisting of ethylene and propylene and an ethylenically unsaturated monocarboxylic acid selected from the group consisting of acrylic acid, methacrylic acid and mixtures thereof wherein the ethylenically unsaturated acid constitutes between about 1% and about 10% by weight of said copolymer (A), and (B) a blend having a first constituent comprising a low molecular weight olefin polymer selected from the group consisting of homopolymers and copolymers of ethylene and propylene wherein the olefin polymer has a standard load melt index greater than about 10 and an intrinsic viscosity less than about 2.0 and having a second constituent comprising a polymer of an ethylenically unsaturated monocarboxylic acid selected from the group consisting of acrylic acid and methacrylic acid and wherein the ethylenically unsaturated acid constituent constitutes between about 1% and about 10% by weight of said blend (B);

said first polymeric constituent comprising between about 30% and about 60% by weight of said mixture of polymeric constituents;

said microporous sheet having been formed by the extrusion of an extrusion mixture wherein said siliceous filler comprised between about 10% and about 90% thereof, said plasticizer comprised between about 20% and about 70% thereof with up to about 98% of said plasticizer being subsequently removed by solvent extraction, and the remainder thereof consisted essentially of the mixture of two polymeric constituents.

4,024,324
NOVEL POLYOLEFIN COMPOSITION OF MATTER

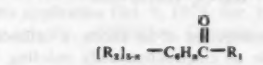
Allen K. Sparks, Basking Ridge, N.J., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 596,692, July 17, 1975, which is a continuation-in-part of Ser. No. 428,561, Dec. 26, 1973, abandoned. This application Dec. 9, 1975, Ser. No. 639,148

Int. Cl.² C08J *3/20*

U.S. Cl. 526—2 **13 Claims**

1. A polyolefin containing from about 0.01 to about 10 wt. % of an aryl ketone and from about 0.01 to about 10 wt. % of a borate or phosphate ester of an alkanol amine, said aryl ketone having the structure:



in which R_1 is selected from the group consisting of an alkyl, aryl, alkaryl, aralkyl, cycloalkyl, substituted alkyl, substituted aryl, substituted alkaryl, substituted aralkyl or substituted cycloalkyl radical and R_2 is selected from the group consisting of an alkyl, aryl, alkaryl, aralkyl, cycloalkyl, alkoxy, halogen, carboxy, carboalkoxy, substituted alkyl, substituted aryl, substituted alkaryl, substituted aralkyl, substituted cycloalkyl, substituted alkoxy, substituted carboxy and substituted carboalkoxy radical, and in which n is equal to an integer between 0 and 5; and said alkanol amine being the reaction product of an aliphatic amine with one or more equivalents of an olefinic epoxide.

4,024,325
PROCESS FOR PREPARING ETHYLENE-CARBON MONOXIDE COPOLYMERS USING PEROXYESTERS HAVING A TEN-HOUR HALF-LIFE LOWER THAN 60° C

Donald E. Hudgin, Princeton Junction, N.J., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 496,497, Aug. 12, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,193

Int. Cl.² C08G *2/00, 4/00, 67/02*

U.S. Cl. 526—11.1 **17 Claims**

1. An improved process for preparing ethylene-carbon monoxide copolymers comprising reacting a mixture of ethylene and carbon monoxide in the presence of a peroxy ester of an organic acid having a ten hour half-life temperature, determined in 0.2 M benzene solution, not greater than about 60° C.

4,024,326
PROCESS FOR PREPARING ETHYLENE-CARBON MONOXIDE COPOLYMERS USING A PEROXYDICARBONATE CATALYST

Donald E. Hudgin, Princeton Junction, N.J., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 501,526, Aug. 29, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,194

Int. Cl.² C08G *67/02;* **C08F** *210/02;* **C08G** *2/00*

U.S. Cl. 526—11.1 **11 Claims**

1. An improved process for preparing ethylene-carbon monoxide copolymers comprising reacting a mixture of ethylene and carbon monoxide in the presence of a peroxydicarbonate catalyst.

4,024,327
BAKING FINISHES WHICH DO NOT POLLUTE THE ENVIRONMENT

Horst Diefenbach, Ludwigshafen, and Karl-Ludwig Platt, Mainz-Gonsenheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed July 12, 1976, Ser. No. 704,562

Claims priority, application Germany, Aug. 1, 1975, 2534400

Int. Cl.² C08F *8/30*

U.S. Cl. 526—50 **6 Claims**

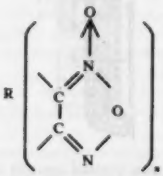
1. A baking finish which does not pollute the environment and which comprises a mixture of

a. a polymer containing hydroxyl groups,

b. a crosslinking component and, if appropriate

c. one or more assistants from the group comprising solvents, dispersing agents, pigments, fillers, flow control agents, plasticizers and catalysts,

wherein the crosslinking component is a furoxane of the formula



where

R is a 2n-valent aliphatic, aromatic, cycloaliphatic, araliphatic or alicyclic hydrocarbon radial of 2 to 20 carbon atoms, which may be unsubstituted or substituted, and *n* is an integer from 1 to 4.

4,024,328
METHOD FOR ALKYLATING AMINOMETHYLACRYLAMIDE POLYMERS

Maurice L. Zweigle, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

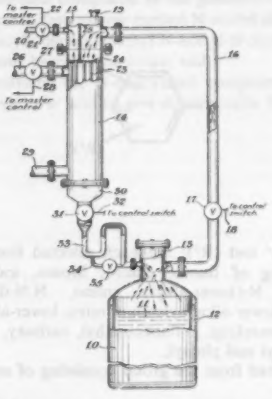
Filed Oct. 1, 1975, Ser. No. 618,650
Int. Cl.² C08F *8/02*
U.S. Cl. 526—54 **9 Claims**

1. In a method for the preparation of a water-soluble polyquaternary-ammonium derivative of an acrylamide polymer wherein an alkylating agent is reacted with an N-dialkylaminomethyl derivative of said acrylamide polymer in an aqueous medium, the improvement which consists of adjusting the aqueous medium to a pH of 6.5 or less and incorporating therein a catalytic amount of an alkanol containing 1 to 4 carbon atoms prior to contacting said medium with the alkylating agent.

4,024,329
METHOD FOR REMOVING HEAT FROM A CHEMICAL REACTION

Richard P. Lauer; Richard S. Rankl, and Theodore H. Dehnke, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed July 3, 1975, Ser. No. 593,158
Int. Cl.² C08F *2/22, 236/06, 212/08*
U.S. Cl. 526—61 **1 Claim**



1. A method for removing heat from the exothermic reaction involved in obtaining a latex product by emulsion polymerization of styrene and butadiene, the method comprising the steps of:

providing a reactor vessel for containing a liquid mixture, the vessel including an outlet;

providing a condenser unit which includes a header section, a vent means in the header section, a tube bundle positioned below the header section, a shell section which surrounds the tube bundle, and a collector section which is positioned below the tube bundle;

providing an entry conduit which connects the outlet of the reactor with the header section of the condenser;

providing a return conduit which connects the collector section of the condenser with the outlet of the reactor, the return conduit having an S shape;

providing a temperature control unit which has a predetermined temperature set point therein, the control unit being connected into the vent means of the condenser unit;

placing in the reactor vessel an aqueous solution which contains latex particles, styrene, and butadiene;

heating the aqueous solution to initiate reaction of the latex, styrene, and butadiene; the said reaction being an exothermic reaction which produces a vapor phase containing a mixture of gases which includes butadiene gas and other gases;

directing the vapor phase from the reactor, through the reactor outlet, through the entry conduit, through the condenser header section, and into the tube bundle;

cooling the vapor phase in the tube bundle to a temperature at which the butadiene gas will condense to a liquid phase, the other gases in the vapor phase being non-condensable at this temperature;

passing the liquid butadiene from the tube bundle of the condenser, through the collector section, through the return conduit, and into the reactor vessel; the liquid butadiene thereby cooling the aqueous solution in the reactor vessel;

continuously trapping some of the liquid butadiene in the S shaped return conduit; the liquid forming a seal which blocks the vapor phase in the reactor outlet from entering the return conduit;

continuously monitoring the temperature in the reactor through the temperature control unit, the temperature control unit causing the vent means to open and thereby discharge the non-condensable gases from the condenser when the temperature in the reactor vessel exceeds the temperature set point in the temperature control unit, the temperature control unit further causing the vent means to close when the temperature in the reactor vessel drops below the temperature set point in the temperature control unit.

4,024,330
INTERNALLY COATED REACTION VESSEL AND PROCESS FOR COATING THE SAME

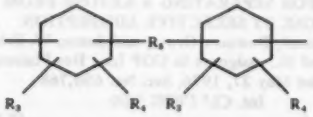
Marion G. Morningstar, Avon Lake, and Henry J. Kehe, Akron, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 566,086, April 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 507,129, Sept. 18, 1974, abandoned. This application Aug. 26, 1975, Ser. No. 607,262
Int. Cl.² C08F *10/00*
U.S. Cl. 526—62 **49 Claims**

1. A polymerization reaction vessel having on all the internal surfaces thereof a coating comprised of a polyaromatic amine having the structure selected from the group consisting of

wherein (1) A, B, and C are selected from the group consisting of

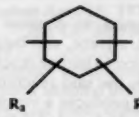
(a)



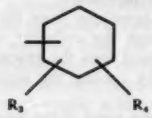
wherein R_3 and R_4 are either —H, —OH, —NH_2, halogen, or an alkyl group containing from 1 to 8 carbon atoms and may be the same or different; and R_5 is

or a straight chain or branched alkylene or alkylidene group containing from 1 to 5 carbon atoms; and

(b)

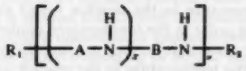


wherein R_3 and R_4 are the same as for (a); and wherein A, B and C may be the same or different and each repeating unit may be the same or different; R_1 and R_2 are either —H, —OH, —NH_2, or

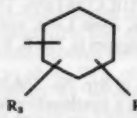


and may be the same or different and wherein R_3 and R_4 are the same as for (a); and (3) x is an integer from 1 to 20 and y is an integer from 0 to 20; and

II.



wherein (4) A, B, R_1, R_3, R_4 and R_5 are the same as in I. and R_2 is —H, —OH, or



as defined in (2); and (5) x is an integer from 1 to 4 and y is an integer from 1 to 15, said polyaromatic amine being straight chained or branched and having a molecular weight greater than about 250.

4,024,331

PROCESS FOR SEPARATING A KETOSE FROM AN ALDOSE BY SELECTIVE ADSORPTION

Richard W. Neuzil, Downers Grove, and James W. Priegnitz, Elgin, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed May 27, 1976, Ser. No. 690,768

Int. Cl.² C07G *3/00*

U.S. Cl. 536—1 **49 Claims**

1. A process for separating a ketose from a mixture comprising a ketose and an aldose which process comprises contacting at adsorption conditions said mixture with an adsorbent comprising a X zeolite containing at a exchangeable cationic sites a cation selected from the group consisting of sodium, barium and strontium thereby selectively adsorbing said ketose and thereafter recovering said ketose.

4,024,332

AMINOGLYCOSIDE ANTIBIOTICS AND INTERMEDIATES THEREFOR

Brian Richard Fenner, Broadstairs; John David Hardstone, Deal, and Michael Ramond Graves Leeming, Canterbury, all of England, assignors to Pfizer Inc., New York, N.Y.

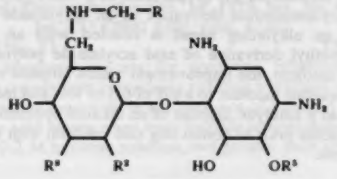
Filed June 4, 1974, Ser. No. 476,269

Claims priority, application United Kingdom, June 5, 1973, 26718/73; June 5, 1973, 26719/73

Int. Cl.² C07H *15/22*

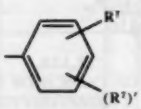
U.S. Cl. 536—10 **26 Claims**

1. A compound of formula



and the pharmaceutically-acceptable acid-addition salts thereof;

wherein R is selected from the group consisting of phenyl, 1-and 2-naphthyl, 1-, 2- and 9-anthryl, 1-,2-, 3-,4- and 92-,3- and 4-pyridyl, 2- and 3-furyl, 2- and 3-thienyl, 2-, 4- and 5-pyrimidyl, 2- and 3-imidazolyl, 2-, 3- and 4-quinolyl, 2- and 3-indolyl and

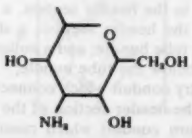


wherein R^7 and $(R^7)'$ are each selected from the group consisting of fluoro, chloro, bromo, iodo, hydroxy, amino, N-(lower-alkyl) amino, N,N-di(loweralkyl) amino, lower-alkanoylamino, nitro, lower-alkoxy, lower-alkyl, benzyloxy, trifluoromethyl, carboxy, lower-alkoxycarbonyl and phenyl;

R^8 is selected from the group consisting of amino and hydroxy;

R^6 is selected from the group consisting of hydrogen and hydroxy;

and R^5 is selected from the group consisting of hydrogen and



4,024,333

SYNTHESIS OF DAUNOSAMINE HYDROCHLORIDE FROM A D-MANNOSE STARTING MATERIAL

Derek Horton, and Wolfgang F. Weckerle, both of Columbus, Ohio, assignors to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Filed June 22, 1976, Ser. No. 698,689
Int. Cl.² C07G *11/00*
U.S. Cl. 536—17 5 Claims

1. A method for the synthesis of daunosamine hydrochloride from methyl α-D-mannopyranoside, which comprises the steps of:

a. benzylidenting said methyl α-D-mannopyranoside to the 2,3:4,6-dibenzylidene acetal with α,α-dimethoxytoluene;

b. converting said 2,3:4,6-dibenzylidene acetal into the 4,6-O-benzylidene-2-deoxy-3-keto compound with butyllithium;

c. oximating the 3-keto group to the 3-oxime group with hydroxylamine;

d. reducing said 3-oxime group to the 3-amino group with lithium aluminum hydride;

e. acetylating said 3-amino group to the 3-acetamido group with acetic anhydride and recovering from the reaction mixture the 4,6-O-benzylidene-D-ribo-3-acetamido compound;

f. converting said 4,6-O-benzylidene-D-ribo-3-acetamido compound into the 4-O-benzoyl-6-bromo-6-deoxy compound with N-bromosuccinimide;

g. dehydrobrominating said 4-O-benzoyl-6-bromo compound to the 4-O-benzoyl-5,6-unsaturated compound with silver fluoride;

h. debenzoylating said 4-O-benzoyl-5,6-unsaturated compound to the 4-hydroxy-5,6-unsaturated compound by catalytic transesterification with sodium methoxide;

i. stereospecifically hydrogenating said 4-hydroxy-5,6-unsaturated compound in the presence of palladiu -on-barium sulfate to give methyl N-acetyl-β-daunosaminide;

j. N-deacylating said methyl N-acetyl-β-daunosaminide with aqueous barium hydroxide; and

k. hydrolyzing the N-deacylated compound with aqueous hydrochloric acid to give daunosamine hydrochloride.

4,024,334

ADSORBENT MATERIALS

Bruce Veness Chandler, Chatswood, and Robert Leonard Johnson, North Ryde, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed Feb. 20, 1975, Ser. No. 551,291
Claims priority, application Australia, Feb. 21, 1974, 6670/74
Int. Cl.² C08B *3/06, 3/18*
U.S. Cl. 536—65 12 Claims

1. An adsorbent material effective for the adsorption of limonoid principles from citrus fruit juices comprising discrete gel beads of a size within the range of 1.7 to 6.4 mm. diameter, such beads consisting essentially of at least one cellulose ester material selected from the group consisting of cellulose acetate and cellulose acetate butyrate and sufficient water to form a gel.

4,024,335

HOMOGENEOUS HYDROXY-ALKYLATION OF CELLULOSE

Myron Donald Nicholson, St. Albans, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 4, 1976, Ser. No. 683,111
Int. Cl.² C08B *11/00*
U.S. Cl. 536—95 6 Claims

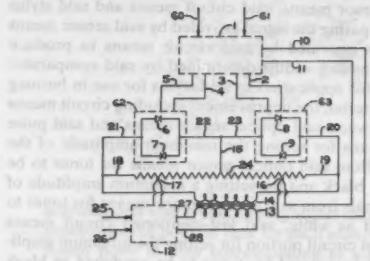
1. The method of hydroxy-alkylating cellulose which comprises contacting a slurry of cellulose and dimethyl sulfoxide containing up to about 15 percent cellulose with sufficient formaldehyde to effect a homogeneous solution and then contacting said solution with a 1,2-alkylene oxide in the presence of a catalyst at a temperature of about 0° and 110° C. for at least one hour.

4,024,336

SPLIT BUSHING CONTROL

Thomas H. Jensen, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 636,003
Int. Cl.² C03B 5/02
U.S. Cl. 13—6 8 Claims



1. Apparatus for maintaining a first part and a second part of an electrical heating element at predetermined temperatures, said parts being energized from the secondary winding of a power transformer having a primary winding and a secondary winding, comprising first circuit means including a first temperature controller and a first temperature sensitive element, constructed and arranged to regulate said power transformer in response to temperature signals from said first temperature sensitive element, said power transformer secondary winding being electrically connected in parallel with said heating element, circuit means including a second temperature controller, a second temperature sensitive element, and a first and a second full wave variable impedance device, said circuit means being arranged to permit current to flow through said first full wave variable impedance device and said second full wave variable impedance device in response to temperature signals from said second temperature sensitive element, such that sufficient current is supplied to said second part of said heating element to maintain a predetermined temperature therein, circuit means to connect said first full wave variable impedance device and said second full wave variable impedance device to a null point between said first part and said second part of said heating element, said first temperature controller and said second temperature controller, each being set at a predetermined temperature.

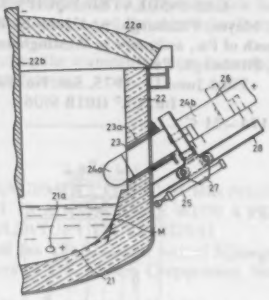
4,024,337

DC ARC FURNACE AND STARTING ELECTRODE CONSTRUCTION

Conny Andersson, and Erik Lassander, both of Viken, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Dec. 11, 1975, Ser. No. 639,917
Claims priority, application Sweden, Dec. 12, 1974, 7415576
Int. Cl.² H05B 7/00
U.S. Cl. 13—18 5 Claims

1. A DC arc furnace comprising a hearth through which electric power can be transmitted to a melt when formed on the hearth, an enclosure for the hearth, at least one arcing electrode extending through said enclosure for initially melting a charge of solid metal on said hearth and thereafter heating the resulting melt, said enclosure having at least one opening, and a starting electrode through which electric power is transmitted to a charge of solid metal on said hearth until the charge is melted down to a melt on the hearth, said starting electrode comprising a metal bar long enough to be positioned through said opening with an outer end portion available for connection with an electric power source and an inner end for forming a connection with a charge of solid metal on said hearth, and having a tip for contacting said charge and made of carbonaceous material connected to said inner end, a closure for space around said rod when the rod is positioned through said opening, being connected to said rod, and rod being insertable and removable from said enclosure through



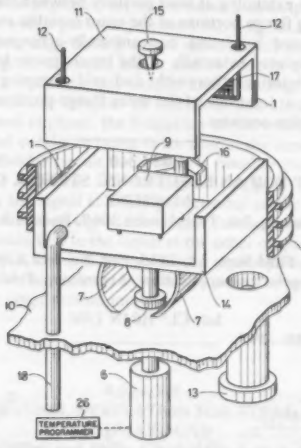
said opening, and said closure closing said space when the rod is inserted through said opening.

4,024,338

HIGH TEMPERATURE HEAT INSULATION

László Körtvelyéssy, P.O. Box 1447, D-419 Kleve, Germany

Filed Nov. 11, 1974, Ser. No. 522,929
Claims priority, application Germany, Nov. 17, 1973, 2357535; May 25, 1974, 2425435
Int. Cl.² F27D 1/00; H05B 3/00
U.S. Cl. 13—20 2 Claims



2. A high-temperature vacuum furnace preferably above 2000 ° k with heat insulation comprising

a movable wall section adapted to receive a charge including a bottom insulation comprising,

a plurality of thin metal foils disposed surface-wise adjacent to each other without spacers therebetween and substantially arranged parallel to a surface to be insulated,

said foils have portions randomly touching each other by metal-to-metal contact, and that gas with a pressure which ranges up to vacuum is present between the foils,

said wall section is identical with said bottom insulation,

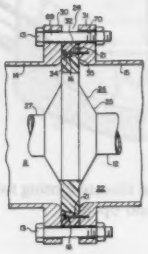
lifting means for moving said wall section together with a charge,

temperature programmer means operatively coupled to said lifting means for actuation of the latter.

4,024,339
SUPPORTING INSULATOR ASSEMBLY FOR GAS-INSULATED EQUIPMENT

Jeffry R. Meyer, Pittsburgh, and John S. Billings, Jr., Trafford, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 19, 1975, Ser. No. 588,572
Int. Cl.² H01B 9/06
U.S. Cl. 174—21 C **15 Claims**

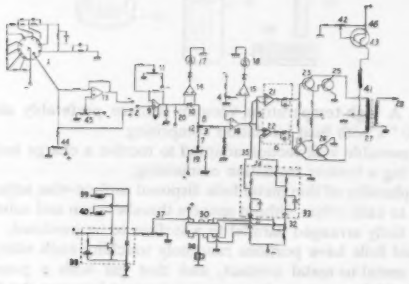


1. A metal-enclosed high-voltage gas-insulated transmission line comprising an electrical inner high-voltage conductor, means defining an outer metallic enclosure comprising a confronting pair of pipe-sections each having a flange portion, the two flange portions confronting each other, an insulating spacer body (**25**) coaxially mounted on the inner high-voltage conductor and supporting said inner high-voltage conductor coaxially within said outer metallic enclosure, said annular spacer body (**25**) forming a central passage for the inner high-voltage conductor (**27**) and having an outer peripheral rim portion extending at least partially between the two outer confronting flange portions of the outer metallic enclosure, an outer-disposed insulating concentrically-arranged clamping ring (**32**) located externally of the inner spacer body **25** and having an interface therewith, and said clamping face being clamped to at least one of the outer flange portions on one of the outer pipe-sections.

4,024,340
CIRCUIT FOR AN ELECTRONIC STENCIL CUTTING MACHINE

Julio G. Tauszig, Int. Tompkinson 3069, Buenos Aires, Argentina

Filed Sept. 12, 1975, Ser. No. 612,636
Claims priority, application Argentina, Feb. 27, 1975, 257800
Int. Cl.² H04N 1/00
U.S. Cl. 358—297 **6 Claims**



1. In an apparatus for electrically burning information from an original document into a stencil material having non-linear burning characteristics including a stylus for applying electrical pulses for burning said material and an electrical circuit coupled to said stylus for providing said electrical pulses thereto, said circuit comprising optical sensor means for scanning the information on said original document and providing an output signal the amplitude of which is proportional to the light reflected by said information, circuit means for providing a train of pulses the shape of which conforms to the non-linear characteristics of the stencil material and means coupled to said optical sensor means, said circuit means and said stylus means for comparing the signal provided by said sensor means and the pulses provided by said circuit means to produce output pulses having widths determined by said comparator circuit means for application to said stylus for use in burning said stencil material, the improvement including circuit means interposed between said optical sensor means and said pulse comparing means for setting the minimum amplitude of the output signal from said optical sensor means for tones to be reproduced as black and for setting a maximum amplitude of the output signals from said optical sensor means for tones to be reproduced as white, said last-mentioned circuit means including a first circuit portion for setting the minimum amplitude of said output signal for tones to be produced as black comprising first circuit element means having first and second input and an output, said optical sensor means connected to said first input for providing a reference signal of a level indicative of the tone to be reproduced as black, variable voltage applying means coupled to said second input for applying a voltage thereto selected to produce an output of a predetermined voltage level and first means for indicating the production of said predetermined voltage level at said output, whereby any signal produced by said optical sensor means of a level lower than or equal to the level of said black reference signal produces a comparator output pulse having a maximum width for application to said stylus and a second circuit portion for setting the maximum amplitude of the output signal of said optical sensor means for tones to be reproduced as white, comprising second circuit element means having an input and output, said optical sensor means effectively connected to said input for providing a reference signal of a level indicative of the tone to be reproduced as white, variable voltage applying means coupled to said input for applying a voltage thereto selected for producing an output of a predetermined voltage level and second means for indicating the production of said predetermined voltage level at said output whereby any signal produced by said optical sensor means of a level greater than or equal to said white reference signal produces a comparator output pulse of zero for application to said stylus.

4,024,341
METHOD OF PICKING OUT SYNCHRONIZING LIGHT BEAM IN LIGHT SCANNING SYSTEMS

Tsunehiko Takahashi, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 21, 1975, Ser. No. 597,503
Claims priority, application Japan, July 23, 1974, 49-84409
Int. Cl.² H04N 3/00
U.S. Cl. 358—206 **10 Claims**

1. A method for picking out a synchronizing light beam in a light scanning system, said method comprising the steps of

generating a signal light beam of a first wavelength;

generating said synchronizing light beam of a second wavelength different than said first wavelength;

rotating a polygonal mirror having a plurality of geometrically similar facets;

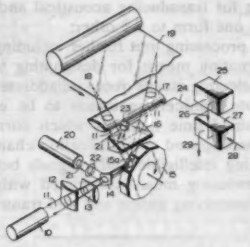
advancing both light beams together on a common optical axis until the light beams are deflected by a facet of said mirror;

dividing the two deflected beams into two separate optical axes; and

detecting the divided synchronizing light beam to generate a synchronizing signal in response thereto, said detecting step occurring at predetermined position with respect to said mirror so that the synchronizing signal is generated only when the synchronizing light beam is deflected from

at least one predetermined respective point on each facet of the mirror;

whereby said signal light beam is available for repetitive



scanning and said synchronizing signal marks at least one predetermined point in time for each scan; each predetermined point in time corresponding to a predetermined common point on the facets of the mirror.

4,024,342
SYSTEM FOR DETECTING DIGITAL DATA TRANSMITTED BY MODULATING A CARRIER

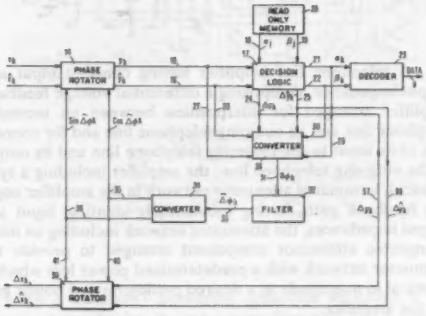
Alain Croisier, Cagnes, Mer, and André Eugene Desblache, Nice, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,460

Claims priority, application France, Dec. 27, 1974, 74.43560

Int. Cl.² H04L *27/22*

U.S. Cl. 178—67 **9 Claims**



1. In a data transmission and reception system in which data is transmitted by varying the phase and amplitude of a carrier by discrete values at discrete sampling times, a reception system for detecting the transmitted data in a received signal while reducing the effects of the noise components altering the phase and amplitude of said received signal, comprising:

means for deriving an in-phase component and a quadrature component from said received signal;

means for rotating said in-phase component and said quadrature component, an angular amount which is a function of an estimated value of the phase error in said received signal;

means for storing two sets of Q, where Q is an integer, reference coordinates defining Q possible states said carrier is capable of assuming during each sampling time;

means for comparing the rotated in-phase component and the rotated quadrature component with each of the Q reference coordinates of said first and second sets, respectively, for selecting the reference coordinates in the first and second sets which most closely compare to the values of the rotated in-phase component and the quadrature component, respectively, during each sampling time;

means for determining said estimated value of the phase error in said received signal as a trigonometric function of the rotated components and the selected reference coordinates; and

means for detecting the transmitted data from the selected reference coordinates.

4,024,343
CIRCUIT ARRANGEMENT FOR SYNCHRONIZING AN OUTPUT SIGNAL IN ACCORDANCE WITH A PERIODIC PULSATORY INPUT SIGNAL

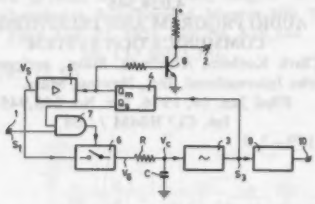
Adriaan Cense, and Jan Van Straaten, both of Nijmegen, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 7, 1975, Ser. No. 575,441

Claims priority, application Netherlands, May 27, 1974, 7407060

Int. Cl.² H04N *5/12;* **H03B** *3/06*

U.S. Cl. 358—148 **6 Claims**



1. Circuit arrangement for synchronizing an output signal in accordance with a periodic pulsatory input signal, comprising a coincidence stage having a first input means for receiving the input signal, a second input, and an output, a phase discriminator coupled to said output and including a low-pass filter, an oscillator coupled to said filter and controllable in frequency and in phase, the frequency of the oscillator in the synchronized condition being twice that of the input signal, a frequency divider circuit comprising a bistable element coupled to said oscillator and having two output terminals, a transition in the signal at an output terminal of the frequency divider circuit occuring within each time interval in which there is no transition in the signal at the other output terminal, the first output terminal being coupled to the phase discriminator and the second ouput terminal being coupled to the coincidence stage second input.

4,024,344
CENTER CHANNEL DERIVATION FOR STEREOPHONIC CINEMA SOUND

Ray Milton Dolby, and Philip Charles Plunkett, both of London, England, assignors to Dolby Laboratories, Inc., San Francisco, Calif.

Filed Nov. 12, 1975, Ser. No. 631,319

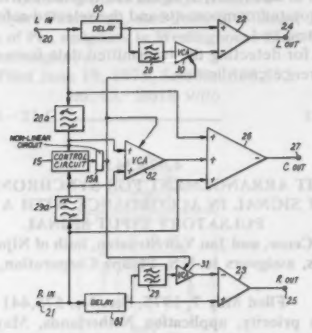
Claims priority, application United Kingdom, Nov. 16, 1974, 49724/74

Int. Cl.² H04R *5/00*

U.S. Cl. 179—1 G **17 Claims**

1. A circuit for deriving a centre channel signal in a stereophonic reproduction system, comprising left and right signal channels, a centre signal channel including means for combining signals from the left and right channels, and control means arranged to compare the signals from the left and right channels and to control the relative gains of the said channels in such a manner that the relative gain of the centre channel is enhanced when the compared signals include significant

amounts of correlated or in-phase information, said left and right signal channels each include means for delaying the

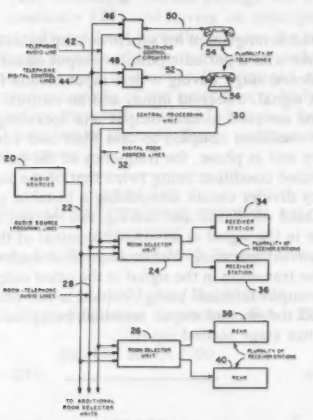


output signals from the channels relative to the output signal from the centre channel.

4,024,345
AUDIO PROGRAM AND TELEPHONIC COMMUNICATION SYSTEM

Robert Clark Kochem, Attleboro, Mass., assignor to Strom Industries International, Inc., Newton, Mass.

Filed Jan. 14, 1976, Ser. No. 648,945
Int. Cl.² H04M *11/08*
U.S. Cl. 179—1 B **14 Claims**



1. Apparatus for simultaneously carrying a plurality of audio signals over a transmission line between a central location and a plurality of remote locations comprising:

said transmission line;

an address line intercoupling at said central location a central processing unit and at least one remote location selecting means associated with a plurality of said remote locations for carrying digital address signals for designating respective remote locations to exchange audio signals with said transmission line;

each of said remote locations having remote transceiving means which are coupled to said transmission line through one of said remote location selecting means which further includes means responsive to a predetermined digital address signal on said address line for enabling a designated remote transceiving means to exchange audio signals with said transmission line;

said remote location selecting means further including analog storage means for storing an electrical analog signal and means for selectively coupling said analog storage means to said transmission line;

each of said remote transceiving means including means for coupling said analog storage means to a remote transducing means for transducing acoustical and electrical energy from one form to the other;

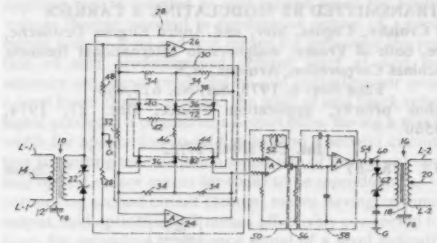
said central processing unit further including remote location designating means for designating to said remote location selecting means over said address line certain of said remote transceiving means to be enabled during predetermined time intervals which correspond to respective time-spaced communication channels

for exchanging intelligible audio signals between said remote transducing means associated with said enabled remote transceiving means and said transmission line.

4,024,346
TELEPHONE LINE AMPLIFIER

Noel C. McDermott, Santa Cruz, Calif., assignor to Kentrox Industries, Inc., Portland, Oreg.

Filed Oct. 10, 1975, Ser. No. 621,422
Int. Cl.² H04B *3/08*
U.S. Cl. 179—1 A **4 Claims**



1. A telephone line amplifier having constant input and output impedance, comprising a differential voltage feedback amplifier arranged for interposition between an incoming telephone line and an outgoing telephone line and for connection of its input to the incoming telephone line and its output to the outgoing telephone line, the amplifier including a symmetrical, terminated attenuator network in the amplifier negative feedback path, having substantially identical input and output impedances, the attenuator network including an interchangeable attenuator component arranged to provide the attenuator network with a predetermined power loss which is identical in magnitude to a desired predetermined power gain for the amplifier.

4,024,347
TELEPHONE CALCULATOR

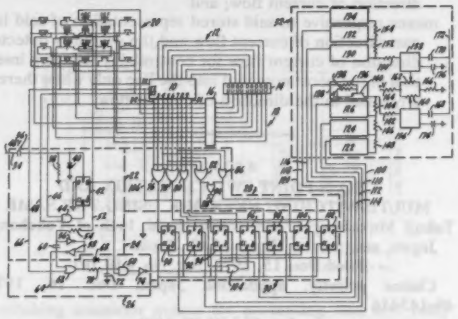
Everett M. Carter, Winona, Minn., assignor to Lake Center Industries, Winona, Minn.

Filed Aug. 11, 1975, Ser. No. 603,437
Int. Cl.³ H04M *1/50*
U.S. Cl. 179—2 DP **12 Claims**

1. In combination, calculating means, series of switches connected to said calculating means for causing operation thereof, indicating means connected to said calculating means for showing the inputs thereto,

a telephone, telephone tone generating means, and control circuit means having input connections to said switches and said calculating means and an output connection to said telephone tone generating means and telephone including a decode matrix connected to said calculating means and a data latch connected between said decode matrix and said tone generating means, means connected to said data latch and switches for providing reset and

clock signals therefor, and a reset gate connected to said data latch and means connected to said telephone for

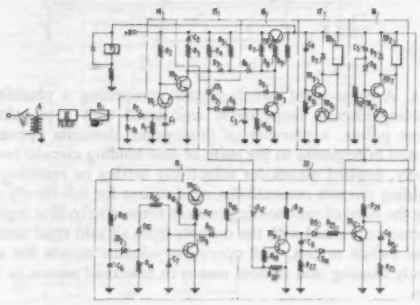


providing an input thereto, whereby operation of said switches will cause operation of said telephone generating means through said control circuit means.

4,024,348
REMOTE CONTROLLABLE AUTOMATIC TELEPHONE ANSWERING APPARATUS

Terumasa Simizu, Kawagoe, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed June 25, 1975, Ser. No. 590,521
Claims priority, application Japan, June 25, 1974, 49-71830
Int. Cl.² H04M *1/64*
U.S. Cl. 179—6 E **3 Claims**



1. In a telephone answering apparatus including a tape transport mechanism having a recording tape and a record/-playback head for playing back previously recorded messages, said mechanism being of the type operable by a single plunger to switch the direction of motion of the tape, a remote control circuit comprising:

detecting means for detecting single frequency remote control signals received by the telephone answering apparatus,

a time constant circuit including a condenser and first and second switchable resistive discharge paths for said condenser,

first switch means responsive to the discharge of said condenser through said first resistive discharge path for switching said time constant circuit to said second resistive discharge path to permit remote control signals having the same frequency but occurring sequentially in time to be used for a plurality of instructive signals,

a first power supply switch responsive to said first switch means to provide a first power source output,

a tape control driving circuit including actuating means for actuating said single plunger, said tape control driving circuit being initially responsive to said first power source output from said first power supply switch to cause said tape transport mechanism to rewind said recording tape,

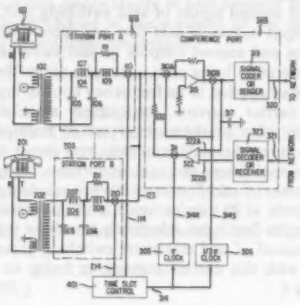
a second power supply switch including time delay means and responsive to the operation of said first power supply switch to provide a second power source output after a predetermined time delay, and

second switch means initially responsive to said second power source output to provide a signal to said tape control driving circuit to cause said tape transport mechanism to stop rewinding said tape and begin playing back said previously recorded messages, said second switch means thereafter being responsive to the discharge of said condneser through said second resistive discharge path to provide a signal to said tape control driving circuit to cause said tape transport mechanism to again rewind said recording tape followed by another signal to said tape control driving circuit to cause said tape transport mechanism to resume playing back said previously recorded messages.

4,024,349
QUASI-RESONANT TRANSFER CONFERENCING CIRCUIT

John Francis O'Neill, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 22, 1976, Ser. No. 679,244
Int. Cl.² H04J *3/02*
U.S. Cl. 179—15 AA **8 Claims**



1. A conference port for a telephone switching system including a plurality of station ports each having a resonant transfer sampling circuit, said conference port comprising:

a capacitor and first summing amplifier means for applying to said capacitor during a first time interval lasting a predetermined fraction of the normal resonant transfer interval summation voltage samples from all said station ports; and

second summing amplifier means for returning to all of said station ports during a second time interval having a longer duration than said first time interval a predetermined fraction of the summation voltage on said capacitor.

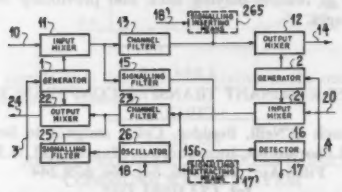
4,024,350
CHANNEL SWITCHING UNIT FOR A TELEPHONE SWITCHING CENTER AND SWITCHING ARRANGEMENTS UTILIZING SUCH UNITS

Pierre Deman, and Guy Le Parquier, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Oct. 30, 1975, Ser. No. 627,454
Claims priority, application France, Oct. 31, 1974, 74.36490
Int. Cl.² H04J *1/00*
U.S. Cl. 179—15 FS **16 Claims**

1. A channel switching unit for a telephone switching equipment in a telephony system utilising single side band multi-

plexing, said switching unit having first and second inputs and first and second outputs and comprising; first and second branches for two-way transmission, each branch comprising in series an input mixer having a first input, a carrier current input and an output, a single side band channel filter having an input connected to said output of said input mixer and an output, and an output mixer having a first input coupled to said output of said channel filter, a carrier current input, and an output, the channel filters of said two branches being identical; and first and second variable frequency generators having respective digital frequency control inputs and respective outputs, the output of said first generator being connected to the carrier current inputs of said input mixer of said first branch and of said output mixer of said second branch, the output of said second generator being connected to the carrier current inputs of said output mixer of said first branch and of



said input mixer of said second branch; the first inputs of said input mixers of said first and second branches forming said first and second inputs of said switching unit, the outputs of said output mixers of said first and second branches forming said first and second outputs of said switching unit, each of said generators being able to supply, under the action of control signals applied to its frequency control input, *m* predetermined carrier currents, respectively associated with the m channels of a predetermined set of multiplexed channels, referred to as the maximum switching group, the pass-band of said channel filters and said m currents being such that said input mixer of said first branch when receiving any one of said m currents at its carrier input, and said maximum switching group at its first input selectively translates into said passband that channel of said maximum switching group which is associated with this carrier current, m being an integer greater than 1.

4,024,351

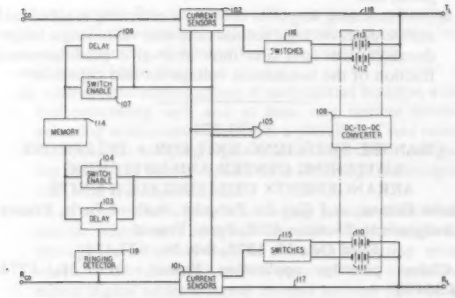
TELEPHONE LINE BATTERY BOOST CIRCUIT

Edwin Coy Ingle, Julian, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 26, 1976, Ser. No. 652,051

Int. Cl.² H04Q *1/30*

U.S. Cl. 179—16 F **15 Claims**



1. In a battery boost range extender of the type including current sensors for detecting the direction of current flow in a transmission line and switching elements for controllably inserting boost potential into the line to series aid an applied potential to the line, wherein the improvement comprises:

means for storing a representation of the last past detected direction of current flow; and

means responsive to said stored representation of said last past direction of current flow and the presently detected direction of current flow for controllably delaying insertion of the boost potential into the line only when there is a reversal in the direction of current flow.

4,024,352

CROSS-POINT SWITCH MATRIX AND MULTISWITCHING NETWORK USING THE SAME

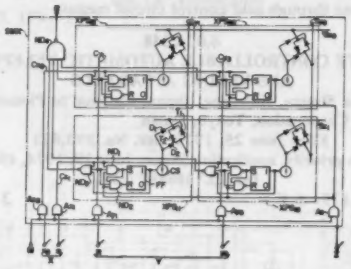
Takuji Mukaemachi, and Tohru Hoshi, both of Yokohama, Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 15, 1975, Ser. No. 640,701

Claims priority, application Japan, Dec. 16, 1974, 49-143416

Int. Cl.² H04Q *3/00*

U.S. Cl. 170—18 GF **11 Claims**



1. A cross-point switch matrix comprising a plurality of holding circuits respectively associated with a plurality of cross points, a plurality of cross-point elements opened or closed in response to the state of said holding circuits respectively, control means for selectively setting or resetting said holding circuits respectively, read means for selectively reading the state of said holding circuits respectively, first logic OR means impressed with the outputs from all said read means in said switch matrix, and operation selector means for selectively causing said control means or said read means to operate.

4,024,353

KEY TELEPHONE SYSTEM

Tokuhisa Hijikata, Ome, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,488

Claims priority, application Japan, Jan. 21, 1975, 50-9589

Int. Cl.² H04M *1/00*

U.S. Cl. 179—99 **7 Claims**

1. A key telephone system comprising:

a visual indicator circuit for indicating both holding and in-use conditions of telephone line,

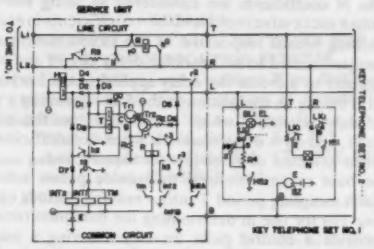
a line holding control circuit,

a control line connected to said visual indicator circuit and to said line holding control circuit,

a line circuit comprising a first normally energized relay for a talking supervision, said first relay restoring in response to a voltage drop on said control line and a second relay for line holding control;

means responsive to said telephone line being manually placed on hold, for establishing a self-holding circuit for said second relay and for sending an intermittent ground on said signal line to said visual indicator circuit regarding the line being held,

means responsive to said telephone line being manually placed on hold, for dropping the voltage potential of said control line so as to restore said first relay; and,



switching transistor means for preventing said first relay from operating in response to said intermittent ground when a line is being held.

4,024,354

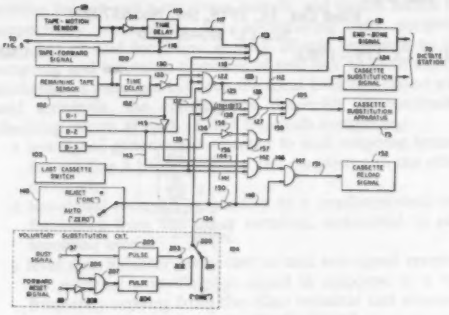
CASSETTE CENTRAL DICTATION SYSTEM

Fred C. Bolick, Jr.; Theodore Titus, IV, and Said Mohammadioun, all of Atlanta, Ga., assignors to Lanier Business Products, Inc., Atlanta, Ga.

Continuation of Ser. No. 327,501, Jan. 29, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 554,476

Int. Cl.² H04M *11/10*

U.S. Cl. 179—100.1 DR **13 Claims**



1. In a recording system, means for retaining a first recording medium in a recording position relative to a transducer means for recording on said first recording medium in response to control conditions provided by a dictate station, seizure means for providing a seizure condition which renders said first recording medium responsive to said control conditions provided by said dictate station, and substitution means selectively responsive to the termination of said seizure condition for substituting a second recording medium for said first recording medium in said recording position relative to said transducer means.

4,024,355

PIEZOELECTRIC ELECTRO-ACOUSTIC TRANSDUCER WITH NON-UNIFORM BACKING

Gaiko Takahashi, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

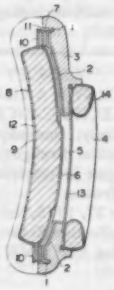
Filed Nov. 24, 1975, Ser. No. 634,377

Claims priority, application Japan, Nov. 27, 1974, 49-144045

Int. Cl.² H04R *17/00*

U.S. Cl. 179—110 A **7 Claims**

1. In a piezoelectric electro-acoustic transducer comprising a diaphragm made of a flexible piezoelectric film material, a support means of a relatively stiff material supporting the edge of said diaphragm, a resilient backing member fitted to the diaphragm to impart at least one of a resiliency and tension to the diaphragm, and a base plate of a stiff material compressing the resilient backing member against said diaphragm, the improvement wherein the resilient backing member includes a locally protruded section for imparting to different parts of the



flexible diaphragm different properties in respect of at least one of the resiliency and tension, said locally protruded section occupying less than the full width of said resilient backing member and locally increasing the thickness of said resilient backing member, such that said locally protruding section forms a local thickness discontinuity in said resilient backing member and a local change in the pressure of the resilient backing member against said diaphragm.

4,024,356

TRANSMISSION SYSTEM WITH BALANCED BRIDGE TO PREVENT LOW FREQUENCY CROSS TALK

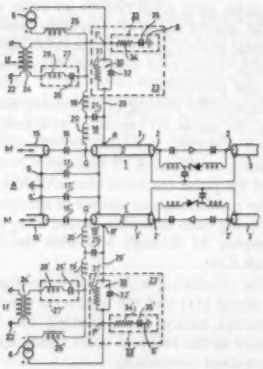
Jasper Hendrik Duimelaar, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 2, 1975, Ser. No. 619,062

Claims priority, application Netherlands, Oct. 14, 1974, 7413451

Int. Cl.² H04B *3/44*

U.S. Cl. 179—170 J **3 Claims**



1. A main transmission station for use at the junction of a pair of ungrounded coaxial transmission cables having repeaters therein, and a pair of coaxial transmission cables having grounded outer shields said station comprising, a first capacitor means for coupling between the respective inner conductors of said grounded and ungrounded cables and a second capacitor means for coupling between the respective outer shields of said grounded and ungrounded cables, whereby

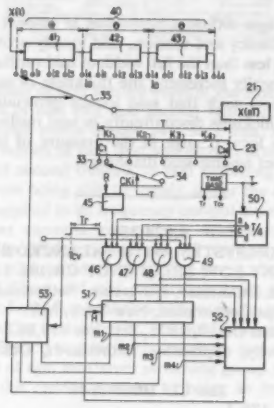
low-frequency cross-talk can occur due to significant voltages developed across the capacitor means coupled to the outer shields of said ungrounded cables, a pair of direct current source means for supplying the repeaters in said ungrounded cables, a pair of high frequency stop filter means for coupling said source means to said ungrounded cables respectively, each of said filters having a parallel capacitor, a pair of low frequency signal sources, and a pair of means for coupling said low frequency sources to said ungrounded cables respectively, said coupling means each including bridge means for suppressing said cross-talk.

4,024,357

CENTERING DEVICE FOR A TRANSVERSE FILTER OF AN ECHO CANCELLER

Jacques Sourgens, Massy; Dominique Lajotte, Ris Orangis, and Francois Michelon, Bretigny-sur-Orge, all of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed June 27, 1975, Ser. No. 591,078
Claims priority, application France, July 3, 1974, 74.23133
Int. Cl.² H04B *3/20*
U.S. Cl. 179—170.2 **3 Claims**



1. In a long distance telephone network, for use at a point where an echo path gives rise to an echo signal $y(t)$, in response to an inward signal $x(t)$ an echo canceller for developing a synthetic echo signal $y(t)$; the echo canceller comprising an adjustable transverse filter of determinate convergence time Tcv, and including:

a first register for storing N successive samples Xl through XN of the signal $x(t)$ samples at a sample interval T;

a second register for storing N successive filtration weighting coefficients Cl through CN simulating N samples of the pulse response characteristic of the echo path;

means for producing one sample of the synthetic echo signal $y(t)$ during each sampling period T by convolution of the N samples Xl through XN with the N coefficients Cl through CN;

means for producing a residual echo signal $\epsilon(t)$ from the echo signal $y(t)$ and the synthetic echo signal $y(t)$, and

servo-control means for adjusting the N coefficients in response to the residual echo signal $\epsilon(t)$;

the improvement comprising:

a variable delay circuit connected between an input for the inward signal $x(t)$ and an input to said first register,

said variable delay circuit comprising a series connection of a plurality of delay elements each having a predetermined delay of TN/n, where N/n is a whole number,

each of said delay elements having an output switchable to said input to said first register

means for accepting in succession the N coefficients Cl through CN during each sampling period T and for detecting any of said coefficients which is higher in value than a given threshold value R,

means for detecting the rank of said detected coefficients of value greater than R, for detecting the minimum such rank and for storing the minimum rank detected, where the N coefficients are considered as being sub-divided into n successive ranks with N/n coefficients in each rank;

switching means responsive to the stored minimum rank and connected to said variable delay circuit and said first register to increase the delay applied to the inward signal $x(t)$ before its application to the first register by a number of delay elements which is one less than the minimum rank, and by n delay elements when no coefficient C has been detected of value greater than R; and

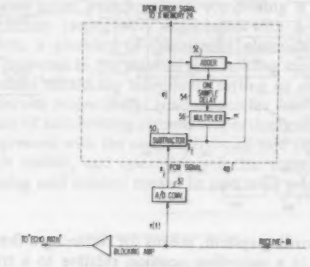
time base means arranged to provide pulses subdividing each sampling period T into n ranking periods each lasting T/n for use in determining the minimum rank and to provide a control pulse waveform having a minimum-rank search-period of duration Tr which is at least as great as T with a non-search period of duration which is at least as great as the convergence period Tcv, such that a minimum rank is sought in cycles, each cycle having a duration of at least Tcv + Tr, thereby allowing the coefficients to converge in a new order after each variation of the variable delay circuit.

4,024,358

ADAPTIVE ECHO CANCELLER USING DIFFERENTIAL PULSE CODE MODULATION ENCODING

Krishnamoorthy Virupaksha, Brookeville, Md., assignor to Communications Satellite Corporation (Comsat), Washington, D.C.

Filed Oct. 31, 1975, Ser. No. 627,809
Int. Cl.² H04B *3/20*
U.S. Cl. 179—170.6 **4 Claims**



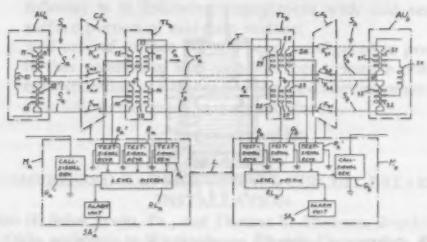
1. In an echo canceller of the type having, a transversal filter means for performing convolution of an input signal on a received line and a replica of the impulse response of an echo path to generate an approximation of an echo signal for subtraction from a real echo signal on a send line, and an adaptive control loop responsive to the residual echo resulting from said subtraction and to stored samples of said input signal for incrementally varying said replica to reduce said residual echo, said transversal filter comprising means for sampling said input signal and converting each sample to an (n+1)-bit digital word, means to store a plurality of n-bit digital words corresponding to samples of said input signal and means for replacing the n-bit digital word corresponding to the oldest sample with an n-bit digital word corresponding to each new sample, said adaptive control loop comprising means for varying elements of said replica only in response to said residual echo and said individual stored samples being greater than threshold levels, the improvement comprising, differential pulse code modulation encoding means connected between said sampling means and said means for storing digital words corresponding to samples of said input signals for encoding

said $(n+1)$-bit digital words as n-bit digital words as a function of the difference between said $(n+1)$-bit digital words and computed estimates of said $(n+1)$-bit digital words based on the redundancy present in said input signal.

4,024,359
CONTINUITY-CHECKING NETWORK FOR TELECOMMUNICATION SYSTEM

Franco De Marco, Milan, and Gualtiero Rigo, Settimo Milanese (Milan), both of Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Feb. 11, 1976, Ser. No. 657,263
Claims priority, application Italy, Feb. 12, 1975, 20181/75
Int. Cl.² H04B 3/46
U.S. Cl. 179—175.3 R **4 Claims**



1. In a telecommunication system with two terminals interconnected by at least one link having an outgoing branch and an incoming branch, a local line at each terminal with a transmitting branch and a receiving branch, and switch means for respectively connecting the transmitting and receiving branches of said local line at each of said terminals to the outgoing and incoming branches of said link to facilitate the exchange of messages between the local lines associated with said terminals, the combination therewith of continuity-checking means at each of said terminals comprising:

a test-signal generator connected to said outgoing branch for sending a predetermined test frequency to the other terminal;

a test-signal receiver, responsive to a predetermined test frequency from the other terminal, connected to said incoming branch;

a level discriminator connected to said test-signal receiver for emitting a verification signal in response to a test frequency arriving from the other terminal and attaining a predetermined lower intensity limit; and

an ancillary signal receiver inserted in a phantom circuit formed by the transmitting and receiving branches of the associated local line, said phantom circuit being substantially balanced upon proper closure of said switch means for minimizing a component of said arriving test frequency picked up by said ancillary signal receiver, said level discriminator being further connected to said ancillary signal receiver for emitting said verification signal only upon said component falling short of a predetermined upper intensity limit.

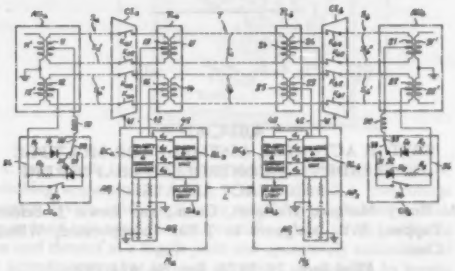
4,024,360
STATION CHECKING NETWORK FOR TELECOMMUNICATION SYSTEM

Giorgio Biraghi, Cusano Milanino (Milan), and Carlo Alberto Manghi, Rosate (Milan), both of Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Feb. 11, 1976, Ser. No. 657,388
Claims priority, application Italy, Feb. 12, 1975, 20180/75
Int. Cl.² H04B 3/46
U.S. Cl. 179—175.3 R **13 Claims**

1. In a telecommunication system with a terminal, at least one link with an outgoing branch and an incoming branch originating at said terminal, a local line with a transmitting branch and a receiving branch extending between said terminal and a subscriber station, connector means at said terminal for respectively coupling the transmitting and receiving branches of said local line to the outgoing and incoming branches of said link to facilitate the exchange of messages between said local line and a remote junction, and switching means at said subscriber station with a plurality of positions corresponding to different operational modes, the combination therewith of mode-checking means comprising:

a source of direct current at said terminal; conductor means for inserting said source in a phantom circuit extending by way of said transmitting and receiving branches of said local line to said subscriber station, said phantom circuit



including said switching means and further including impedance means at said subscriber effective in different position of said switching means to vary the magnitude of a direct current flowing from said source through said phantom circuit;

current-sensing means connected to said phantom circuit at said terminal for discriminating between direct currents of different levels indicative of said different operational modes , and

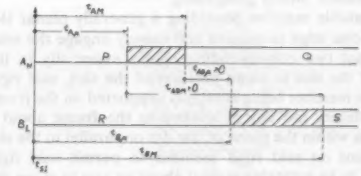
switchover means connected to said source at said terminal for revesing the polarity of said direct current;

said impedance means including two oppositely poled diodes respectively insertable in said phantom circuit in different positions of said switching means.

4,024,361
METHOD OF AND MEANS FOR IDENTIFYING TEMPORARILY COACTING UNITS IN A TELECOMMUNICATION SYSTEM

Ottavio Bertoglio, Turin, Italy, assignor to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy

Filed Aug. 29, 1975, Ser. No. 609,071
Claims priority, application Italy, Aug. 29, 1974, 69637/74
Int. Cl.² H04M 3/22
U.S. Cl. 179—175.2 C **12 Claims**



1. A method of ascertaining the participation of temporarily coacting operating units intervening in the establishment of a connection in a telecommunication system, said coacting units being part of respective groups of substantially identical units belonging to different classes of equipment, comprising the steps of:

monitoring the units of a first group for detecting a change of state in any one unit of said first group;

monitoring the units of a second group, any of them operatively associable with any unit of said first group, for detecting a change of state in any one unit of said second group with a predetermined timing relative to a detected change of state in any one unit of said first group; and

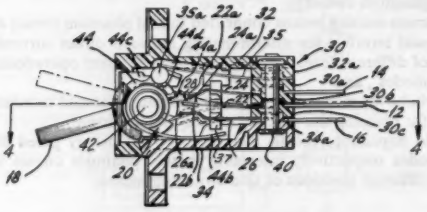
registering only the identities of the units of said first and second groups in which changes of state are detected with said predetermined relative timing.

4,024,362

SWITCH ACTUATOR ASSEMBLY FOR MULTIPLE INDEPENDENTLY CONTROLLED LEAF SPRING CONTACT ARRAYS

A. Henry Morgan, Westport, Conn., and Lewis J. Seiden, Tappan, N.Y., assignors to T-Bar Incorporated, Wilton, Conn.

Filed Sept. 19, 1975, Ser. No. 614,789
Int. Cl.² H01H 9/00, 3/32
U.S. Cl. 200—1 TK **13 Claims**



1. In a switch array having multiple sets of at least opposed pairs of contacts, opposed pairs of parallel flat resilient conductive switch blades arranged side-by-side with the respective corresponding blades cantilever supported in generally common planes generally parallel to one another by rigid mechanical engagement of each blade at one end by an insulating portion of a support frame, the contacts being supported on said blades opposed to one another adjacent to the unsupported end of the blade, one of the blades of each pair being moved from its plane by actuator means engaging that blade at its unsupported end proximate to its contact, an improved actuator means comprising

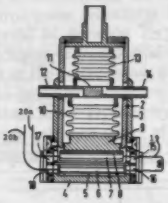
a rigid rotatable member providing a generally planar slot open at one edge to receive and closely engage the ends of at least two corresponding blades essentially in the plane of the slot in some position of the slot, said rigid rotatable member being rotatably supported on the frame for oscillatory movement relative to the frame about a fixed axis within the plane of the slot or parallel to the slot and means on said rigid member to permit said rigid member to be rotatably moved about its axis to move the slot-engaged end of engaged blades in a direction generally transverse to their plane and their supported contacts toward or away from engagement with their opposed contacts, and means acting between the frame and the rigid rotatable means to releasably hold the rigid rotatable member against rotation when its actuated contacts are engaged.

4,024,363

SHORTING CONTACTS FOR CLOSING A SUPERCONDUCTING CURRENT PATH OPERATED BY A BELLOWS ARRANGEMENT RESPONSIVE TO THE PRESSURE OF A CRYOGENIC MEDIUM USED IN COOLING THE CONTACTS

Helmut Marsing, Neunkirchen A.B.; Claus-Peter Parsch, Erlangen, and Holger Franksen, Erlangen-Eltersdorf, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 464,240, April 25, 1974, abandoned. This application Nov. 25, 1975, Ser. No. 635,124
Claims priority, application Germany, May 14, 1973, 2324371
Int. Cl.² H01H 1/62, 35/32
U.S. Cl. 200—83 C **14 Claims**



1. A shorting element for closing the superconducting current path of a superconducting magnet coil cooled by a cryogenic cooling medium comprising:

a. a set of contacts of a stabilized superconductive material connected in series with the superconducting magnet coil;

b. a first cryogenic cooling medium at a temperature which will maintain said contacts in a superconducting state surrounding said contacts;

c. a mechanical actuating device of the type which is response to a fluid pressure mechanically coupled to said contacts for bringing said contacts into contact with each other; and

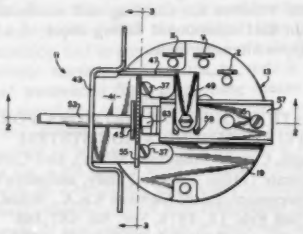
d. means for coupling a second cryogenic medium having a temperature at least approximately equal to that of the first cryogenic medium to said mechanical actuating device.

4,024,364

PRESSURE SWITCH MECHANISM AND CAM STOP ARRANGEMENT THEREFOR

William H. Jones, Villa Park, Ill., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 28, 1975, Ser. No. 636,001
Int. Cl.² H01H 35/34
U.S. Cl. 200—83 S **5 Claims**



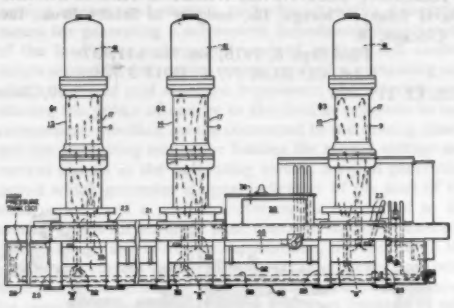
1. A calibration mechanism for a pressure switch of the type having a spring-biased plunger arrangement adjustable to establish different pressure levels required to actuate the switch, said calibration mechanism comprising:

a. a support bracket assembly fixedly mounted relative to the body of the pressure switch;
b. a cam member supported by said bracket assembly and mounted to be rotatable about an axis fixed relative to said bracket assembly, said cam member defining a cam surface;
c. plunger adjustment means pivotally mounted relative to said bracket assembly, and including a cam follower in following engagement with said cam surface;
d. said cam surface defining a range of cam follower positions corresponding to a range of pressure level settings between a normal low setting and a normal high setting;
e. said cam including a second surface portion disposed to define a follower position corresponding to a pressure level setting greater than said normal high setting;
f. said support bracket assembly defines a stop surface disposed to engage said cam follower when said cam follower is in following engagement with said second surface portion of said cam surface;
g. said second surface portion being configured to prevent further rotation of said cam member toward a position corresponding to a higher pressure level setting when said cam follower engages said stop surface.

4,024,365
COMPRESSED-GAS MULTIPHASE CIRCUIT-BREAKER INSTALLATION

Otto H. Soles, Irwin, Pa., and Thomas E. Alverson, Brookfield, Ohio, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 27, 1974, Ser. No. 527,929
Int. Cl.² H01H 33/54
U.S. Cl. 200—148 R 5 Claims

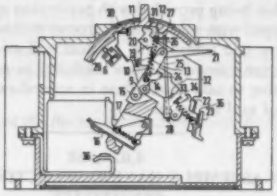


1. In combination, means defining a plurality of gas-blast circuit-breaker assemblages (13, 14, or 15) collectively constituting a multiphase compressed-gas circuit-breaker installation, each assemblage (13, 14 or 15) including a pair of separable contacts constituting primary blast-valve means, one of said separable contacts being hollow and constituting a hollow venting contact, each gas-blast circuit-breaker assemblage (13, 14 or 15) including means defining a relatively large-volume high-pressure region B located externally of said respective separable contacts (19, 20) of the particular assemblage, means defining a relatively small-volume low-pressure region C downstream of said one hollow venting contact (19 or 20), the low-pressure region C of the assemblages (13, 14 or 15) all communicating through individual gas-valves (114) to a common low-pressure gas reservoir tank (28), an individual gauge (115) interposed between each individual gas-valve (114) and the individual low-pressure volume C for the respective gas-blast circuit-breaker assemblage (13, 14 or 15), whereby closing the individual gas-valve (114) of a respective assemblage (13, 14 or 15) will enable maintenance personnel to observe a rise of pressure in a particular individual volume C to thereby selectively determine gas leakage of a particular assemblage (13, 14 or 15) to the exclusion of the other circuit-breaker assemblages (13, 14 or 15).

4,024,366
TOGGLE LEVER SWITCHING MECHANISM FOR AN AUTOMATIC SWITCHING APPARATUS INCLUDING A LOW-VOLTAGE TRIPPING DEVICE

Gerhard Hartwig, Rosenheim, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 5, 1976, Ser. No. 673,384
Claims priority, application Germany, Apr. 23, 1975, 2518093
Int. Cl.² H01H 5/06
U.S. Cl. 200—153 G 4 Claims

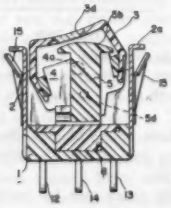


1. In a toggle lever switching mechanism for an automatic switching apparatus including a housing and a low-voltage tripping device, said toggle lever switching mechanism including at least two toggle levers pivotally joined to each other at one end thereof at a toggle joint and operatively connected to an actuating member for said switching mechanism by means of a spring member coupled at one end to said actuating member and at the other end to said toggle joint, the other ends of said toggle levers being pivotally coupled to a movable electrical contact member of said switching apparatus and to a support lever which engages a latching pawl of said switching mechanism, the improvement comprising:
a support lever, pivotally mounted in said housing at one end thereof and pivotally coupled to one of said toggle levers at a point intermediate said one end and the other end of said support lever, and
stop means, disposed in said switching mechanism housing, for engaging and limiting the movement of said support lever so as to prevent said support lever from engaging said latching pawl during initial movement of said actuating member from a contact-open position to a contact-closed position of said switching apparatus.

4,024,367
ROCKER SWITCH WITH SLIDABLE INDICATOR

Yasuo Kodaira, and Nobuo Misaki, both of Tokyo, Japan, assignors to Nihon Kaiheiki Industrial Company, Ltd., Tokyo, Japan

Filed Aug. 28, 1975, Ser. No. 608,739
Claims priority, application Japan, Sept. 13, 1974, 49-109754[U]; Oct. 9, 1974, 49-121152[U]
Int. Cl.² H01H 9/16
U.S. Cl. 200—308 13 Claims



1. A switch comprising
a switch case;
a switch actuator;
a converter for causing conversion of switch contacts, said switch actuator and said converter being connected

together and mounted on the switch case rockably about a common axis;

said switch actuator being provided on its upper surface positioned above said common axis with a transparent window; and

an indicating member having an indicating surface disposed under and in proximity to said transparent window and mounted movably in a horizontal direction on the fixed portion of said switch case,

either one of said converter and switch actuator assembly and said indicating member being provided below said common axis with vertical groove means;

the other being provided with projection means so as to be engaged with said vertical groove means;

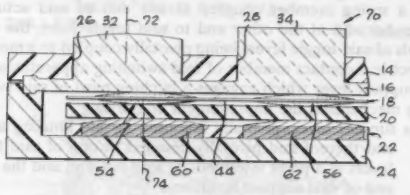
whereby said transparent window and said indicating surface are caused to move mutually in reverse directions relative to said switch case in accordance with the rocking of said actuator.

4,024,368

SWITCH ASSEMBLY HAVING SELECTIVE ACTUATION SENSITIVITY

Ronald Corroalles Shattuck, Canoga Park, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Oct. 2, 1975, Ser. No. 619,137
Int. Cl.² H01H *3/12*
U.S. Cl. 200—314 **6 Claims**



1. A switch assembly comprising:

a. force transmitting means displaceable from a first non-actuation switch position to a second actuating switch position by an actuating force directed along a force transmitting line defined by the centerline of said force transmitting means,

b. flexible indicator means for display of indicia, said flexible indicator means having a centerline defining a force transmitting line, and displaceable by said force transmitting means,

c. said flexible indicator means centerline misaligned with said force transmitting means centerline by a selected distance so that displacement of said transmitting means by the actuating force displaces said indicator means, and said misaligned centerline reducing the transmitted actuating force by a first determinable portion, and

d. switch means operable by said reduced actuating force.

4,024,369

DUAL SIZE WIRE ARC SPRAY GUN

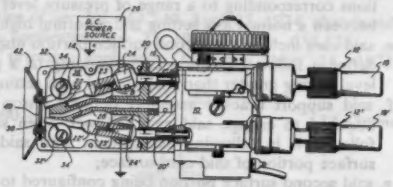
Henry C. Thompson, Huntington Bay, and William T. Tyrrel, E. Northport, both of N.Y., assignors to Metco, Inc., Westbury, N.Y.

Filed June 23, 1975, Ser. No. 589,723
Int. Cl.² B23K *9/04*
U.S. Cl. 219—76 **8 Claims**

1. An arc supply spray gun for melting the ends of two electrically isolated metal wires in an electric arc struck between their ends and spraying molten metal, comprising:

a pair of tubular wire guide members each having an entrance end and an exit end and adapted to have a metal wire threaded therethrough;

a pair of generally tubular electrode members each connected to a respective terminal of a DC power source and each having an entrance and an exit end, the entrance end of each electrode member being adjacent the exit end of a respective one of said guide members and oriented to receive wire issuing from said one guide member, said electrode members being disposed with their respective longitudinal axes convering in the direction of their exit ends toward an intersection point remote from said electrode member exit ends, whereby wire passing through



the electrode members are conducted toward said intersection point to strike and maintain an electric arc, the axes of the electrode members making different obtuse included angles with the respective axes of the wire members, the angle being greater in the case of the electrode member connected to the positive terminal of the power source; and

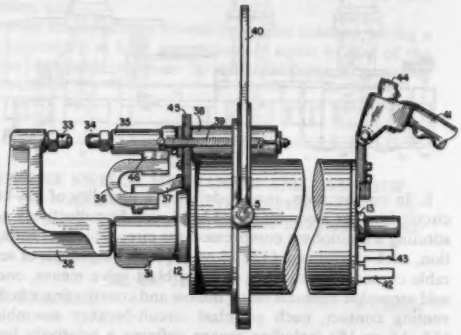
nozzle means positioned to direct a jet of gas toward said intersection point to spray molten metal generated by the arc.

4,024,370

TOROIDAL RESISTANCE WELDING TRANSFORMER

David Sciaky, Chicago, Ill., assignor to Sciaky Bros., Inc., Chicago, Ill.

Filed Sept. 8, 1975, Ser. No. 611,437
Int. Cl.² B23K *11/10*; H01F *27/28*
U.S. Cl. 219—90 **10 Claims**



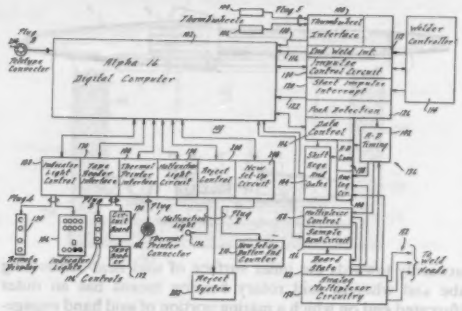
1. A transformer adaptable for use in portable resistance welding machines comprising:

a hollow regular cylindrical iron core wound from a continuous strip of magnetic iron core material; electrically insulating material surrounding the said iron core; a single layer primary winding fabricated from a multiplicity of electrically conductive segments so as to form a continuous single layer winding of toroidal form surrounding the said iron core and insulation; a single turn secondary in close proximity to, but insulated from, and enclosing completely the said primary winding and iron core so as to form a compact cylindrical electrial transformer structure having fixed secondary terminals at one end and primary terminals at the opposite end.

4,024,371
WELDING MONITORING AND CONTROL SYSTEM

Charles J. Drake, Detroit, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.

Filed Dec. 18, 1974, Ser. No. 534,342
Int. Cl.² B23K 11/24
U.S. Cl. 219—110 18 Claims



1. In combination, a welding control system and a pulse type welder wherein pulsed energy is fed from a source of varying voltage to a welding load during a weld period, the control system including sensing means for sensing the voltage and current flowing in the load, the improvement comprising means for generating a standard impedance characteristic from a first set of voltage and current values sensed by the sensing means and storing said characteristic, generating means for generating a subsequent impedance characteristic of the load from subsequently sensed voltage and current values sensed by the sensing means, means for comparing said subsequent and said standard impedance characteristic and altering the pulses of energy to the load in response to said comparison, interface means connected to the sensing means and the generating means for feeding the sensed voltage and current signals to the generating means, a signal generation circuit which generates a signal indicative of the start of the weld period, and a peak detector means connected to the sensing means for sensing a peak characteristic of at least one of the voltage and current and controlling the feeding of the voltage and current signals to the generating means, said peak detector means including a timing circuit and a clock circuit for generating a plurality of pulses which are counted by said timing circuit to time a period from the start of the weld period to an assumed peak, said timing circuit including a presettable counter circuit that is connected to said clock circuit and adapted to be preset to a predetermined number in response to said start of weld period signal, said clock circuit altering said counter to time out said counter upon counting a preselected number of pulses from said clock circuit.

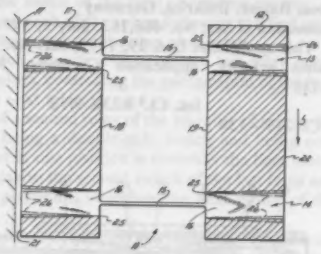
4,024,372
METHOD OF MAKING A LOAD CELL

Robert W. Herrmann, Alliance, Ohio, assignor to Akron Standard, division of Eagle-Picher Industries, Inc., Akron, Ohio

Filed Dec. 19, 1975, Ser. No. 642,480
Int. Cl.² B23K 9/00
U.S. Cl. 219—121 EM 17 Claims

1. A method of making a load cell having two end supporting structures and at least one flexing element including two ends and an intermediate flexing portion therebetween, said flexing portion being disposed between the two end supporting structures, and said ends and said end supporting structures having respective adjacent interface surfaces, the method comprising the step of:

applying localized welding energy to said interface surfaces to weld them together, said localized welding energy being sufficient to weld the flexing element to the supporting structures at said interface surfaces without changing the physical stress and strain characteristics of

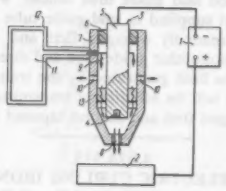


any portion of the flexing element between the supporting structures.

4,024,373
APPARATUS FOR PLASMA WORKING OF ELECTRICALLY-CONDUCTIVE MATERIALS AND METHOD OF OPERATING SAME

David Grigorievich Bykhovsky, Konjushenny pereulok, 1/6, kv. 18, and Alexandr Yakovlevich Medvedev, ulitsa Kalyaeva, 3, kv. 17, both of Leningrad, U.S.S.R.

Continuation of Ser. No. 481,399, June 20, 1974, abandoned. This application May 5, 1976, Ser. No. 683,509
Int. Cl.² B23K 9/00
U.S. Cl. 219—121 P 10 Claims



1. An apparatus for plasma working of electricallyconductive materials comprising: a d.c. source of power whose positive terminal is connected to the workpiece; a plasmatron including a gas-cooled non-consumable electrode; comprising an insert and a holder; means connecting the electrode to the negative terminal of said d.c. power source; an insulator on said non-consumable electrode; a nozzle member fitted on said insulator and having a central passage for discharging plasma-forming gas; said non-consumable electrode, insulator and nozzle defining a chamber communicating with the atmosphere through said central passage; at least one additional passage means connecting said chamber with the atmosphere; a source of plasma-forming and cooling gas connected to said chamber at a location spaced from said additional passage means; a gas-permeable partition disposed in said chamber such that said non-consumable electrode passes through said partition which subdivides said chamber into two parts one of which communicates with the atmosphere through said central passage and the other of which communicates both with said source of plasma-forming and cooling gas and also with the atmosphere by way of said additional passage means.

4,024,374

GUIDE TUBE FOR AN ARC WELDING GUN

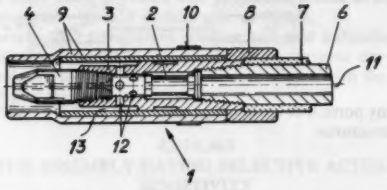
Erwin Cloos, Haiger, Germany, assignor to Die Firma Carl Cloos, Haiger, Dillkries, Germany

Continuation of Ser. No. 486,163, July 5, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,200

Claims priority, application Germany, July 6, 1973, 2334335

Int. Cl.² B23K 9/12

U.S. Cl. 219—130 3 Claims



1. In an electrically conductive guide tube for an arc welding gun having a bore therethrough with the inner surface of said bore electrically contacting and guiding a consumable type wire electrode out of free end thereof and an electrically conductive guide tube holder for holding said guide tube, said free end of said guide tube, while in use, being free of any connection to a further element, the improvement comprising wherein said guide tube is a monolithic member free of lateral slots communicating with said bore and having an external first conically tapered connecting part thereon remote from said free end and an external first tapered thread on said first conically tapered connecting part, said guide tube holder having a recess therein and an internal second conically tapered connecting part in said recess and an internal second tapered thread on said second conically tapered connecting part, said first and second tapered threads being threadedly engaged so that both sides of the side flanks of each thread on said guide tube are in contact with both sides of the side flanks of each thread on said guide tube holder, whereby welding electrical current supplied to said guide tube holder will pass through said threadedly engaged first and second tapered threads to said monolithic guide tube and directly to said wire electrode and the heat generated by the transmission of said welding current will be effectively transmitted through said threadedly engaged first and second tapered threads.

4,024,375

ELECTRIC CURLING IRON

Kaj Sigård Olesen, Copenhagen, and Henrik Bodtcher-Hansen, Charlottenlund, both of Denmark, assignors to H. Bodtcher-Hansen A/S, Copenhagen K, Denmark

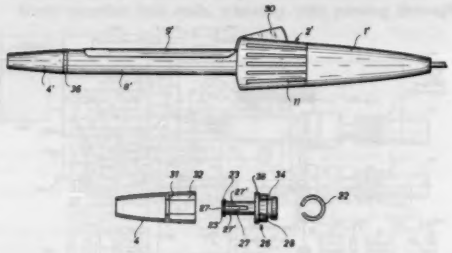
Filed Nov. 4, 1975, Ser. No. 628,779

Claims priority, application Denmark, Nov. 19, 1974, 6010/74; Sept. 19, 1975, 4220/75

Int. Cl.² H05B 1/00; A45D 1/04, 2/00

U.S. Cl. 219—225 2 Claims

1. An electrical curling iron including a stationary handle portion, a rotary handle portion mounted for rotation on said stationary handle portion, a heat-conducting tube rigidly connected at one end to said rotary handle portion, hair clamping means pivotally mounted on said heat-conducting tube, a heating element mounted internally of said heat conducting tube, hand engageable support means mounted adjacent the other end of said heat-conducting tube for permitting the axis of said heat-conducting tube to be stabilized by one hand of a user while said rotary handle portion and said heat-conducting tube are rotated as a unit by the index finger and/or the thumb of the other hand of a user holding said stationary handle portion, rotary bearing means rotatably connecting said hand engageable support means to said heat-conducting tube to permit relative rotation of said hand engageable support means with respect to said heat-conducting tube about the axis of said heat-conducting tube, said rotary bearing means comprising a bearing bushing made of resilient material secured in the heat-conducting tube by a clamping effect, the periphery of the bearing bushing being provided with a groove receiving an expandable clamping ring having portions urged



outwardly towards the inner surface of said heat-conducting tube and wherein said rotary bearing means has an outer bifurcated end on which a mating portion of said hand engageable support means is received for permitting relative rotation of said hand engageable support means and said heat-conducting tube while retaining said hand engageable support means.

4,024,376

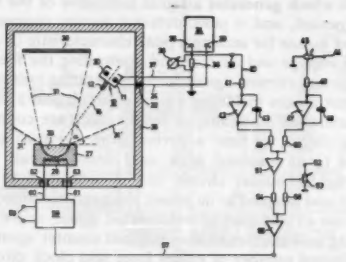
DEVICE FOR MEASURING THE EVAPORATION RATE IN VACUUM EVAPORATION PROCESSES

Karl-Georg Redel, Rodenbach, Germany, assignor to Leybold-Heraeus GmbH & Co. KG, Cologne, Germany

Filed June 13, 1975, Ser. No. 586,657

Int. Cl.² C23C 13/08

U.S. Cl. 219—272 7 Claims

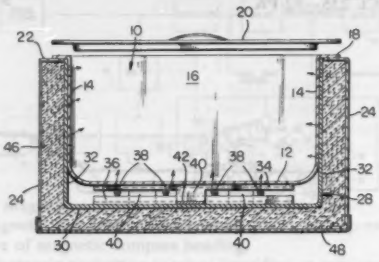


1. A measuring device for determining the evaporation rate of evaporation material in vacuum systems comprising, in combination, a source of material to be evaporated; a substrate spaced from said source of material and impacted by a vapor stream of said material; measuring means for measuring the rate of evaporation of said material from a location outside said vapor stream impacting on said substrate an electrically conducting housing with an opening which can be aligned with material to be evaporated; a vapor sensing electrode located inside said housing and insulated from said housing; an evaluation device for the evaporation rate and connected to said electrode, said electrode being located outside the line of sight through said opening of said housing; a source of direct voltage and having a positive terminal connected to said electrode, said electrode having a positive potential with respect to said housing; and means for applying to said evaluation device the current flowing between housing and electrode.

4,024,377
HOT WELL AND METHOD OF HEATING

Mitchell C. Henke, Fort Wayne, Ind., assignor to Lincoln Manufacturing Company, Inc., Fort Wayne, Ind.

Filed Sept. 10, 1975, Ser. No. 612,258
Int. Cl.² F27D 11/02
U.S. Cl. 219—439 10 Claims

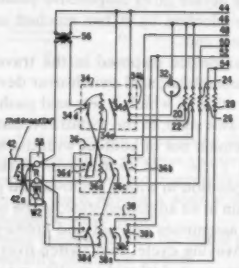


1. In a hot well, especially for food; an upwardly opening heating vessel of heat conducting material having a bottom, side and end walls, a heating element supported beneath said bottom wall for supplying heat thereto at least partly by radiation, a heat sink of good heat conducting material in the form of a U-shaped metal member having a bottom part beneath said heating element and side parts extending upwardly along and engaging the side walls in heat exchange relation, said U-shaped member receiving heat from said heating element and supplying heat to said walls by conduction, a frame connected to the peripheral region of the top of said vessel and having side walls and end walls extending downwardly along the sides and ends respectively of said vessel in spaced relation thereto, a blanket of heat insulation extending over at least the underside of the bottom part of said U-shaped metal member and upwardly between the side parts thereof and the side walls of said frame, and a bottom cover connected to the bottom of said frame and enclosing said heat insulation from below.

4,024,378
ELECTRIC HEATING SYSTEM CIRCUIT FOR SEQUENTIALLY ENERGIZING A PLURALITY OF HEATING ELEMENTS

Harold A. McIntosh, Los Angeles, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed May 1, 1975, Ser. No. 573,703
Int. Cl.² H05B 1/02; F24H 3/04; H02J 3/14
U.S. Cl. 219—486 7 Claims

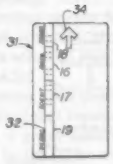


1. A circuit for a heating system comprising
a plurality of electric heating elements;
means including a motor for circulating fluid to be heated;
a plurality of at least three relays each having a heat motor and at least a first and a second switch each of which is closeable by energizing the respective heat motor for at least a predetermined time duration;
the first switch of a first relay of the plurality of relays controlling the motor of the fluid circulating means;
the first switch of each of the relays following the first relay controlling the respective heating elements;
the second switch of each relay, except a last relay of the plurality of relays, controlling the energization of the heat motor of the next relay;
a third switch of a second relay of the plurality of relays, the third switch being a double-pole switch and being connected so that in one position is connects the heat motor of the first relay to the second switch of the last relay and in the other position it energizes the heat motor of the first delay;
a thermostatic switch connected in a first series circuit with the heat motor of the first relay through the second switch of the last relay and the third switch of the second relay to energize the first relay to commence heating of the heating elements and in a second series circuit with the heat motor of the second relay and the second switch of the first relay to deenergize the second relay to commence de-energizing of the heating elements; and
the second switch of the last relay being a double pole switch and connected in one position in the first series circuit between the third switch of the second relay and the thermostatic switch and connected in the other position in a by-pass series circuit with the heat motor of the first relay to by-pass the thermostatic switch to maintain the first relay energized when the last relay is energized.

4,024,379
BINARY SYSTEM FOR MAGNETIC CARD ACTUATION FOR LAUNDRY MACHINES

R. Fred Pfost, and Eric G. Breeze, both of Los Altos, Calif., assignors to Service Distributors, Inc., San Francisco, Calif.

Filed May 19, 1975, Ser. No. 578,652
Int. Cl.² G06K 5/00, 7/08; G11B 5/09
U.S. Cl. 235—61.7 B 15 Claims



1. An apparatus for activating a machine with a magnetic member bearing magnetic signals representing one's and zero's, said magnetic signals having leading and trailing edges, a first predetermined duration when representing a one, a second predetermined duration when representing a zero, and leading edges which are equidistantly spaced, comprising:
means responsive to said magnetic signals for generating pulses of a first polarity corresponding to each of said leading edges and pulses of an opposite polarity corresponding to each of said trailing edges;
means responsive to said pulses of said first polarity for generating clock pulses, said clock pulses having a duration between that of said magnetic signals representing one's and said magnetic signals representing zero's;
means responsive to said clock pulses and said pulses of opposite polarity for generating data pulses and
a first registering means responsive to said data pulses and said clock pulses for registering said data pulses, said data pulses representing a data number and an identification number;
means coupled to said first registering means for validating

said data number and said identification number and providing an enabling signal when acceptable data and identification numbers are present;

means coupled to said first registering means and responsive to said data number for reducing said data number and providing an output corresponding to said reduced data number;

means coupled to said reducing means and said validating means and responsive to said enabling signal for displaying said reduced data number;

means responsive to said enabling signal for activating a machine;

a second registering means coupled to said first registering means and said reducing means and responsive to said enabling signal for registering said reduced data number and said identification number; and

means coupled to said second registering means for recording on said magnetic member, in place of the original magnetic signals, new magnetic signals corresponding to said identification number and said reduced data number, said magnetic signals having a first predetermined duration when representing a one, a second predetermined duration when representing a zero, and leading edges which are equidistantly spaced.

4,024,380

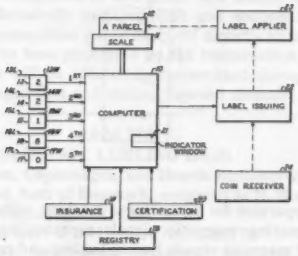
SELF SERVICE POSTAL APPARATUS AND METHOD

Damon Mott Gunn, 4007 49th St., Washington, D.C. 20016

Continuation-in-part of Ser. No. 107,421, Jan. 18, 1971, abandoned. This application July 14, 1975, Ser. No. 595,646

Int. Cl.² G06K *1/12*; **B07C** *5/34*; **G06F** *15/56*; **G01G** *23/38*

U.S. Cl. 235—61.9 A **12 Claims**



5. In a self service postal station which is a part of a zipcode postal system, the method of verifying postal information manually entered by a postal patron, which comprises the steps of

a. storing all zipcode numbers with a geographical description corresponding thereto in a memory,

b. providing at said station a means for the postal patron to manually enter all of the digits of the zipcode number for verification,

c. searching said memory to locate the zipcode number corresponding to the manually entered zipcode, and

d. presenting to the postal patron the said geographical description corresponding to said manually entered zipcode number in human language form as reinforcement to the user that the manually entered zipcode number corresponds to the desired geographical destination of the user's postal article.

4,024,381

ARTICLE COUNTING AND GROUPING APPARATUS

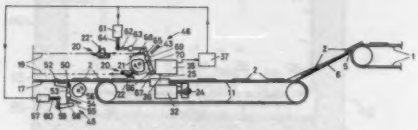
Rêne Fluck, Neuhausen am Rheinfall, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed July 22, 1976, Ser. No. 707,703

Claims priority, application Switzerland, Aug. 4, 1975, 10155/75

Int. Cl.² G06M *7/06*, *3/02*

U.S. Cl. 235—92 PK **5 Claims**



1. In an apparatus for counting and grouping articles, including a discharge end through which the articles are discharged in consecutive groups, each having a predetermined number of articles; a first conveyor means carrying the articles in random distribution; a second conveyor means having a plurality of parallel-arranged counting channels; transfer means for advancing the articles onto the counting channels from said first conveyor means; counting means associated with each counting channel to monitor, from a zero count, the total number of articles passing the counting means in the second conveyor means to determine article groups having a predetermined number of articles; and a third conveyor means having pusher assemblies associated with each counting channel for cyclically taking over the conveyance of the articles from the second conveyor means at a location which is downstream of the counting means as viewed in the conveying direction of the articles; the improvement comprising

a. an arresting device disposed downstream of said counting means, said arresting device having an operative position in which it blocks advance of the articles to said discharge end of said apparatus; said arresting device having an inoperative position in which it allows passage of the articles to said discharge end; said arresting device being operatively connected to said counting means for placing said arresting device in its operative position when an article group that passed said counting means has articles of less than the predetermined number and for placing said arresting device in its inoperative position when the article group blocked by it has reached said predetermined number; and

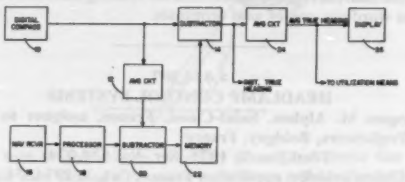
b. a switch-over device disposed in the travelling path of said pusher assemblies; said switch-over device having an operative position in which it sets said pusher assemblies into a withdrawn state; in the withdrawn state said pusher assemblies remain out of contact with the articles during a conveying cycle; said switch-over device having an inoperative position in which it allows said pusher assemblies to remain in an advanced state; in the advanced state said pusher assemblies contact and convey said articles during a conveying cycle; said switch-over device being operatively connected to said counting means for placing said switch-over device in its operative position when an article group that passed said counting means has articles of less than the predetermined number and for placing said switch-over device in its inoperative position when the article group blocked by said arresting device has reached said predetermined number.

4,024,382

LORAN COMPENSATED MAGNETIC COMPASS

John T. Fowler, Winthrop, Mass., assignor to The Laitram Corporation, New Orleans, La.

Filed Sept. 8, 1975, Ser. No. 611,525
Int. Cl.² G01C 21/20
U.S. Cl. 235—150.26 7 Claims



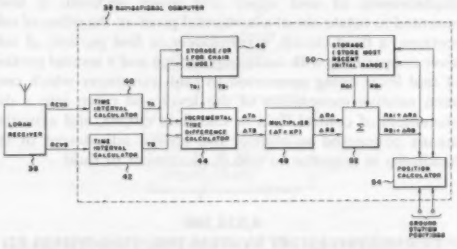
1. A magnetic compass system comprising:
a magnetic compass providing an output signal representative of magnetic compass heading;
an electronic navigation receiver providing an output signal representative of present position;
means responsive to at least two sequential readings from said navigation receiver to provide an output representative of average course made good for a selected heading;
an averaging circuit responsive to the output signal from said magnetic compass to provide a signal representative of average magnetic compass heading;
first subtracting means receiving said signal representative of average course made good and said signal representative of average compass heading and providing an output signal representative of average error therebetween; and
second subtracting means receiving said signal representative of average error and signal representative of magnetic compass heading and providing an output signal representative of true heading.

4,024,383

METHOD AND SYSTEM FOR NAVIGATION EMPLOYING INCREMENTAL RANGE DIFFERENCE

T. James Beasley, Reseda, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Sept. 2, 1975, Ser. No. 609,215
Int. Cl.² G01S 5/02
U.S. Cl. 235—150.27 9 Claims



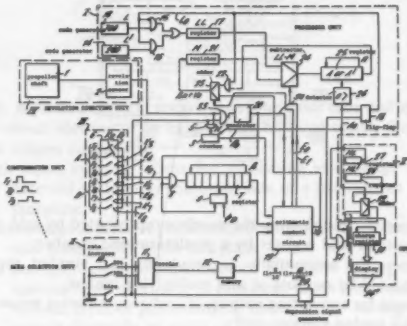
1. A method of navigation comprising the steps of:
a. determining an initial position relative to a plurality of known points each located at predetermined geographic positions and each having a source of radio frequency electromagnetic wave energy;
b. determining the distance of the initial position from each of the plurality of known points;
c. moving to a second and unknown position;
d. determining the difference between the propagation time of electromagnetic wave energy from each of the plurality of points at the initial and second positions to thereby determine an incremental change in the distance to the second position from each of the plurality of points;
e. algebraically summing the distance of the initial position and the incremental change in distance from each of the plurality of points to thereby determine the distance of the second position from each of the plurality of known points; and,
f. determining the second position from the determined distances of the second position from each of the plurality of known points.

4,024,384

MODIFICATION IN ELECTRONIC TAXIMETER

Iwao Tateishi, Yamatokoriyama, and Toshiyuki Maegawa, Higashiosaka, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 24, 1975, Ser. No. 561,475
Claims priority, application Japan, Mar. 22, 1974, 49-32987; May 17, 1974, 49-55917; May 17, 1974, 49-55918
Int. Cl.² G07B 13/10
U.S. Cl. 235—151.32 5 Claims



1. An electronic taximeter adaptable to a variety of different makes and models of vehicles exhibiting a like variety of scaling factors correlating actual distance travelled to a selected standard, comprising:
distance pulse generating means for creating a plurality of distance pulses of which a given number of pulses is representative of a selected standard distance traveled by an associated vehicle;
key switch input means selectively actuated to provide a compensation code signal representative of a said known scaling factor for a given associated vehicle correlating distance travelled by the latter with said selected standard distance; and
means responsive to said distance pulses and said compensation code signal selected by said key switch input means for compensating for said scaling factor and determining the actual distance travelled by the said given associated vehicle.

4,024,385

SECOND DIFFERENCE FUNCTION GENERATOR

Gerald P. Richards, Framingham, Mass., assignor to Raytheon Company, Lexington, Mass.

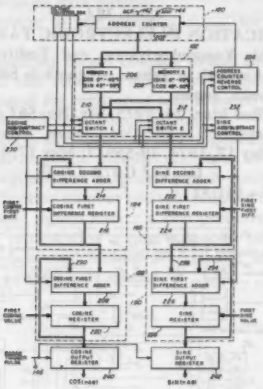
Continuation of Ser. No. 445,179, Feb. 25, 1974, abandoned.
This application Feb. 9, 1976, Ser. No. 656,554
Int. Cl.² G06F 1/02
U.S. Cl. 235—152 12 Claims

1. In combination:
data storage means;
means for sequentially addressing said data storage means;
first adder means;
means for coupling outputs of said data storage means to first inputs of said first adder means;
first register means coupled to outputs of said first adder

means, second inputs of said first adder means being coupled to outputs of said first register means;

second adder means having first inputs coupled to said inputs of said first register means;

second register means coupled to outputs of said second adder means, second inputs of said second adder means being coupled to outputs of said second register means;



means for multiplying the number represented by said outputs of said register by a predetermined number;

means for sequentially accumulating the number represented by outputs of said multiplying means;

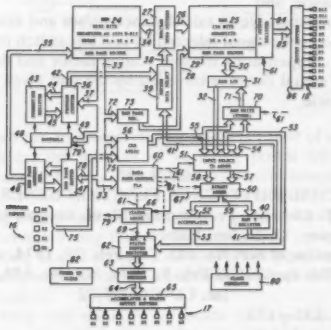
means for converting outputs of said accumulating means to an analog voltage; and

means for deflecting the beam of a cathode-ray tube in accordance with said analog voltage.

4,024,386
ELECTRONIC CALCULATOR OR DIGITAL PROCESSOR CHIP HAVING TEST MODE OF OPERATION

Edward R. Caudel, and Joseph H. Raymond, Jr., both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 19, 1974, Ser. No. 525,244
Int. Cl.² G11C *29/00*
U.S. Cl. 235—153 AM **11 Claims**

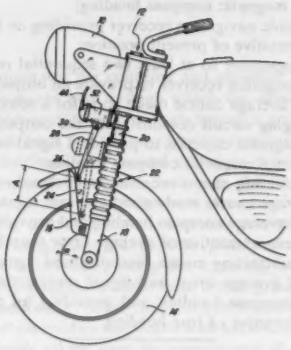


1. In a semiconductor chip for providing the functions of a digital processor of the type having a read-only-memory for storing a large number of instruction words, control means connected to receive the instruction words from the read-only-memory and produce commands for defining operating sequences, address register means for defining a location in the read-only-memory, a plurality of input terminals and output terminals for entering and reading out numerical and operational information, the improvement comprising: means for providing a test mode of operation for the semiconductor chip, including coupling means for connecting at least one of said terminals to the address register means for reading in a specific address, and means for loading the instruction word from the read-only-memory for such address into at least part of the address register means and for reading out such instruction word via one of said terminals.

4,024,387
HEADLAMP CONTROL SYSTEMS

Jacques M. Alphen, Saint-Cloud, France, assignor to Cible Projecteurs, Bobigny, France

Filed Jan. 2, 1975, Ser. No. 538,074
Claims priority, application France, Oct. 2, 1974, 74.33202
Int. Cl.² B62J *5/02*
U.S. Cl. 240—7.1 LJ **7 Claims**



1. A motorcycle including a variable length front suspension having upper and lower relatively displaceable sections, a headlamp pivotally mounted on said upper section, said headlamp being adjustable by pivotal movement about an axis substantially perpendicular to the optical axis of the headlamp, a ramp rigidly connected to one of the said sections and having a ramp surface which is inclined to the direction of displacement of said upper and lower sections, a lever mounted to rotate about a horizontal pivot on the other of said sections, a fluid circuit, a transducer, a first portion of said lever cooperating with said ramp surface and a second portion of said lever being connected to said transducer which converts relative movements of the lever and ramp into a displacement of control fluid in said fluid circuit, and actuating means connected to control the pivotal adjustment of the headlamp in response to said displacement of fluid.

4,024,388
CORNERING LIGHT SYSTEM FOR TWO-WHEELED VEHICLES

Roger E. Skoff, Los Angeles, Calif., assignor to Marvin H. Kleinberg, Inc.; Richard Morganstern Inc. and Seymour A. Scholnick, all of Beverly Hills, Calif.

Filed Mar. 24, 1975, Ser. No. 561,649
Int. Cl.² B62V *5/00*; B60Q *1/12*
U.S. Cl. 240—7.55 **8 Claims**

1. For use in combination with a two-wheeled vehicle a cornering light system comprising:

a lamp assembly including a lamp energizable to emit a light beam of predetermined configuration, and means for fixedly mounting said lamp on said vehicle, said mounting means holding said lamp so that if energized when the vehicle is upright and oriented to move straight ahead,

the center of said light beam is directed forward slantingly toward one side of the vehicle and with an upward incline, and means operable for energizing said lamp during

a turn of the vehicle, whereby when the vehicle tilts to one side during a turn, the light beam will be directed to one side and its upward incline will be dropped to illuminate the road onto which the turn is being made.

4,024,389

PHOTO-IMAGE MEMORY PANEL AND ACTIVATING METHOD THEREFOR

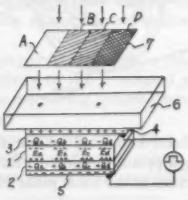
Yoshiharu Kanatani; Masahiro Ise, and Etsuo Mizukami, all of Tenri, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 478,614, June 12, 1974. This application Aug. 7, 1975, Ser. No. 602,669

Claims priority, application Japan, June 15, 1973, 48-68118; June 15, 1973, 48-68119

Int. Cl.² H01J *31/50*

U.S. Cl. 250—213 R **12 Claims**



1. An electro-optical device of the type which exhibits luminescence comprising:

an electroluminescent layer:

a pair of dielectric layers, said electroluminescent layer being sandwiched between the pair of the dielectric layers;

a pair of electrodes;

said pair of dielectric layers and said electroluminescent layer being sandwiched between said pair of electrodes;

means for creating light-excited electric polarization effects at the dielectric layers by means of light excitation and application of bias voltage; and

means for applying a voltage across said electrodes of a sufficient level to cause electroluminescence of said electroluminescent layer.

4,024,390

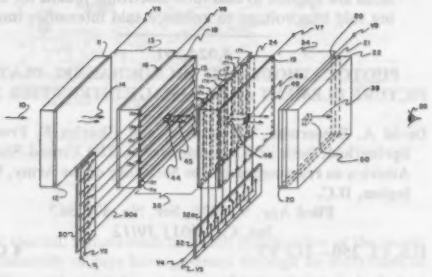
TWO MICROCHANNEL PLATE PICTURE ELEMENT ARRAY IMAGE INTENSIFIER TUBE AND SYSTEM

David A. Bosserman, Alexandria, and Charles F. Freeman, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 9, 1976, Ser. No. 675,366

Int. Cl.² H01J *39/12*

U.S. Cl. 250—213 VT **4 Claims**



1. A picture element array image intensifier tube and system for direct viewing of an image of an external scene, the tube and system comprising:

an input imaging means for presenting said image of an external scene over the input side of a transparent input faceplate;

a continuous layer of photocathode material on the inside of said transparent input faceplate;

a first microchannel plate electron multiplier having a continuous input electrode in proximity focus with said continuous layer of photocathode material and having as an output electrode an array of electrically isolated parallel output electrode metallic stripes;

a second microchannel plate electron multiplier having as an input electrode an array of electrically isolated parallel input electrode metallic stripes and having a continuous output electrode;

an output means comprising a phosphor electrode in proximity focus with said continuous output electrode of said second microchannel plate electron multiplier for direct viewing of an intensified replica of said image of an external scene and an output circuit connected to said phosphor electrode for presenting digitized current intensity from each picture element of said picture element array;

a first microchannel plate output electrode array switching means;

a second microchannel plate input electrode array switching means;

tube electronic means having power supply bias voltages that are applied to image intensifier tube elements and array switching drivers for activating said switching means for selectively switching said bias voltages in some scan mode over individual stripe of said first microchannel plate output electrode array stripes and over individual stripes of said second microchannel plate input electrode array stripes and further having position scan data timing pulses produced in synchronism with activation of said switching means; and

process control electronic means having a built-in program therein and having as a first input said digitized current intensity from each picture element and having as a second input said position scan data timing pulses in synchronism with activation of each picture element by said switching drivers to produce a video type signal and for analysis of each picture element on a digital frame-to-frame basis by comparison of said built-in program with digitized current intensity from each picture element in which said process control electronic means has first,

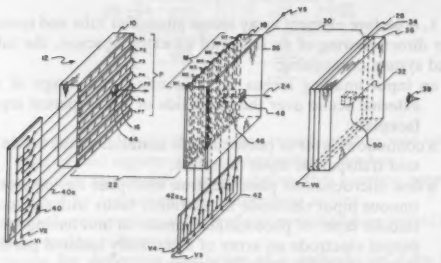
second, and third outputs therefrom wherein said first output is a difference signal that is applied to an external display device and said second output activates a symbology generator according to said built-in program for applying symbology bias voltages through said tube electronic means to said first microchannel plate output electrode array and said second microchannel plate input electrode array and said third output comprises feedback of decisions based on comparison of said built-in program with said digitized current intensity in which said decisions are applied to said tube electronic means for changing said bias voltage to enhance said intensifier image.

4,024,391

PHOTOCATHODE AND MICROCHANNEL PLATE PICTURE ELEMENT ARRAY IMAGE INTENSIFIER TUBE AND SYSTEM

David A. Bosserman, Alexandria, and Charles F. Freeman, Springfield, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 9, 1976, Ser. No. 675,367
Int. Cl.² H01J *39/12*
U.S. Cl. 250—213 VT **4 Claims**



1. A picture element array image intensifier tube and system for direct viewing of an image of an external scene, the tube and system comprising:

an input imaging means for presenting said image of an external scene over the input side of a transparent input faceplate;

a plurality of electrically isolated parallel photocathode array stripes mounted on the inside of said transparent input faceplate;

a microchannel plate electron multiplier having as an input electrode a plurality electrically isolated parallel input electrode array of metallic stripes and a continuous output electrode, said input electrode array of metallic stripes positioned adjacent and in proximity focus to said photocathode array stripes and orthogonal thereto;

an output means comprising a phosphor electrode on the inside of a transparent output faceplate and in proximity focus with said continuous output electrode of said microchannel plate electron multiplier for direct viewing of an intensified replica of said image of an external scene and an output circuit connected to said phosphor electrode for presenting digitized current intensity from each picture element of said picture element array;

photocathode array switching means;

microchannel plate input electrode array switching means;

tube electronic means having power supply bias voltages that are applied to image intensifier tube elements and array switching drivers for activating said switching means for selectively switching said bias voltages in some scan mode over individual stripes of said photocathode array stripes and over individual microchannel plate input electrode array of metallic stripes and further having position scan data timing pulses produced in synchronism with activation of said switching means; and

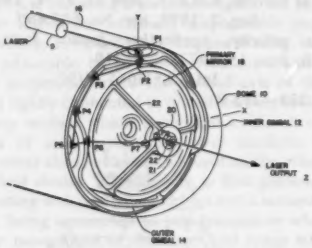
process control electronic means having a built-in program therein and having as a first input said digitized current intensity from each picture element and having as a second input said position scan data timing pulses in synchronism with activation of each picture element by said switching drivers to produce a video type signal and for analysis of each picture element on a digital frame-to-frame basis by comparison of said built-in program with digitized current intensity from each picture element in which said process control electronic means has first, second, and third outputs therefrom wherein said first output is a difference signal that is applied to an external display device and said second output activates a symbology generator according to said built-in program for applying symbology bias voltages through said tube electronic means to said photocathode array and said microchannel plate input electrode array and said third output comprises feedback of decisions based on comparison of said built-in program with said digitized current intensity in which said decisions are applied to said tube electronic means for changing said bias voltages to enhance said intensified image.

4,024,392

GIMBALLED ACTIVE OPTICAL SYSTEM

Edward A. Teppo, and Leonard R. Haugen, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 8, 1976, Ser. No. 664,786
Int. Cl.² H01J *3/14*
U.S. Cl. 250—216 **11 Claims**



1. A gimballed active optical system for use on a stable platform including a primary objective having an optical axis and a detector located in the focal plane thereof the improvement comprising:

an outer gimbal effectively rotatably mounted on said stable platform by a hollow shaft and having an axis of rotation thereabout;

an inner gimbal rotably mounted within said outer gimbal on a hollow shaft having an axis positioned orthogonally with respect to the axis of said outer gimbal;

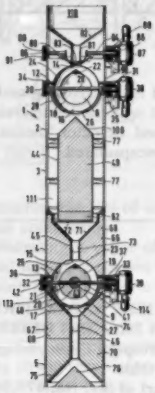
an illumination source for producing a beam of optical energy having a predetermined frequency; and

an optical relay system mounted with respect to said illumination source and on said outer and inner gimbals for directing the beam of optical energy around the said outer and inner gimbals through the hollow shafts thereof to emergy on an optical axis of the gimballed active optical system, whereby a target may be illuminated thereby in such a manner to reflect energy to said primary objective.

4,024,393
APPARATUS FOR ANALYZING FREE-FLOWING MATERIAL

Hartmut Braun, Karlsruhe; Fritz Riffel, Graben-Neudorf, and Walter Hartung, Ludwigshafen, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Mar. 29, 1976, Ser. No. 671,371
Claims priority, application Germany, Mar. 29, 1975, 2514062; Apr. 12, 1975, 2515981
Int. Cl.² G01T *1/161, 3/00*
U.S. Cl. 250—303 **12 Claims**



1. In an apparatus for analyzing flowable material in intermittent sequence; comprising

a. a hollow dosing sphere having an inlet, an outlet and a predetermined inner volume for forming samples of constant volume of the material introduced into said hollow dosing sphere through its inlet;

b. a hollow radiation sphere having an inlet operatively connected to the outlet of said hollow dosing sphere and an outlet;

c. a radiation source supported within and centrally with respect to said hollow radiation sphere for a homogeneous activation of the sample introduced into said hollow radiation sphere from said hollow dosing sphere;

d. a hollow measuring sphere having an inlet operatively connected to the outlet of said hollow radiation sphere and an outlet;

e. a detector arranged in said hollow measuring sphere for sensing the activity of the irradiated sample introduced into said hollow measuring sphere from said hollow radiation sphere; and

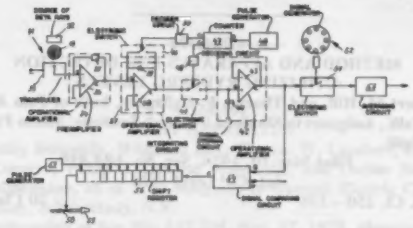
f. material guide means for combining said hollow dosing sphere, said hollow radiation sphere and said hollow measuring sphere into a structural unit.

4,024,394
METHOD AND APPARATUS FOR MEASURING AND REGULATING THE DENSITY OF ROD-LIKE FILLERS CONSISTING OF TOBACCO OR THE LIKE

Joachim Reuland, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Continuation of Ser. No. 480,871, June 19, 1974, abandoned. This application Sept. 12, 1975, Ser. No. 613,030
Claims priority, application Germany, June 22, 1973, 2331855
Int. Cl.² G01N *23/00*
U.S. Cl. 250—308 **10 Claims**

1. A method of measuring changes in the density of a rod-like filler consisting of tobacco, tobacco smoke filtering fibrous material or the like, comprising the steps of conveying said filler lengthwise along a predetermined path; positioning a source of beta radiation adjacent to one side of said path so that beta rays issuing from said source pass across successive minute increments of the moving filler and their intensity decreases as a function of density of the corresponding increments of said filler, the intensity of said rays fluctuating as a result of stochastic disintegration of nuclei of said source; monitoring the intensity of said rays at the other side of said path opposite said source; producing a continuous succession

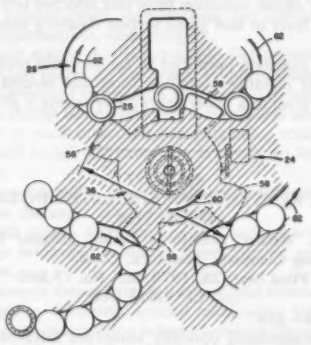


of first electric signals each of which is indicative of the monitored intensity of rays having passed through an increment of said filler; and generating a series of second signals including continuously integrating said succession of first signals for limited periods of time whereby each second signal represents the average density of that portion of said filler which has been conveyed past said source during the corresponding limited period of time.

4,024,395
SAMPLE CHANGER HAVING MODULAR TRACK ASSEMBLY

Anthony A. Mueller, Florence, Ky.; Frank W. Bao, Clermont, Fla.; Stephen D. Parker, Erlanger, and James L. Hummeldorf, Morningview, both of Ky., assignors to Actus, Inc., Florence, Ky.

Filed Mar. 23, 1976, Ser. No. 669,593
Int. Cl.² G01T *1/00*
U.S. Cl. 250—328 **13 Claims**



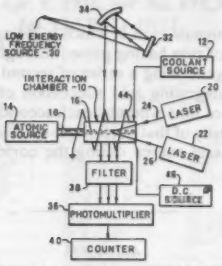
1. An automatic sample changer for transporting a plurality of test samples along a track, and for sequentially studying the characteristics of the samples being tested, the sample changer comprising: a base housing; a modular track housing mounted on said base housing; a testing region located in said base housing for studying the characteristics of the samples being tested; conveyor means in said base housing for sequentially associating the samples with the testing region; a continuous elongated track in said track housing which directly encounters said conveyor means at one location along its length; a plurality of independent transport means sequentially positioned along substantially the entire length of said

track, each of which is adapted to associate with a sample; indexing means in said track housing for associating with said plurality of transport means to advance the samples associated therewith along said continuous track, said indexing means comprising at least one rotatable hub having a plurality of extensions therein, each of which contacts and moves a plurality of said transport means at spaced locations along said track; and motor means in said track housing for controlling the operation of said indexing means.

4,024,396
METHOD AND APPARATUS FOR DETECTION UTILIZING RYDBERG LEVELS

Robert M. Hill, and Thomas F. Gallagher, both of Palo Alto, Calif., assignors to Stanford Research Institute, Menlo Park, Calif.

Filed May 10, 1976, Ser. No. 684,859
Int. Cl.² G01J 3/30
U.S. Cl. 250—338 **20 Claims**



1. A photon detection method for low energy radiation, in the microwave and infrared range, comprising the steps of:

exciting atoms of a material in the vapor state to a selected first Rydberg energy level without excitation of other atoms thereof to a given second Rydberg energy level,

exposing said material at the selected first Rydberg energy level to low energy radiation to be detected for allowed electric dipole transition from said selected first Rydberg energy level to said given second Rydberg energy level, and

detecting radiation produced by spontaneous emission as a result of radiative transition from said second Rydberg energy level to a lower energy level along a given decay path.

4,024,397
SHOCK RESISTANT ENCAPSULATED INFRARED DETECTOR

Seymour L. Weiner, Stamford, Conn., assignor to Barnes Engineering Company, Stamford, Conn.

Filed Sept. 28, 1970, Se.. No. 75,895
Int. Cl.² G01J 1/00
U.S. Cl. 250—338 **5 Claims**

1. An encapsulated optically immersed infrared detector comprising

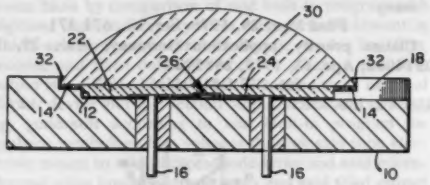
a. a base member having a cavity therein surrounded by a ledge and electrical feedthrough pins mounted in said base member,

b. a thin sheet of insulating material having infrared detector means mounted thereon and a lead pattern on said insulating material connected to said infrared detector means,

c. said thin sheet with said infrared detector means thereon being mounted in the cavity of said base member with said electrical feedthrough pins being connected with the lead pattern thereon,

d. a layer of immersion material positioned on said sheet and filling said cavity up to said ledge in said base member,

e. an infrared window transparent to infrared radiation which is to be detected by said infrared detector means

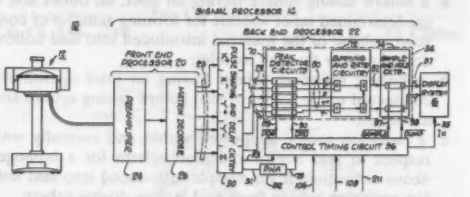


mounted on said ledge covering said cavity and being in intimate contact with said immersion material thereby providing infrared detector means which is optically immersed and encapsulated.

4,024,398
DATA DERANDOMIZER AND METHOD OF OPERATION FOR RADIATION IMAGING DETECTION SYSTEMS

Kenneth F. Hatch, Prospect, Conn., assignor to Picker Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 478,201, June 11, 1974, abandoned. This application May 12, 1975, Ser. No. 576,309
Int. Cl.² G01T 1/20
U.S. Cl. 250—363 S **28 Claims**



1. A radiation imaging system for examining a radiating body, comprising:

a. a radiation detector for generating a series of analog radiation representing event signals randomly occurring in time in response to impinging radiation, the event signals representing the spatial locations of said impinging radiation,

b. a display system for operating on each of a sequence of analog data signals, the operation on each signal requiring a predetermined time for the display system, said display system providing a display representing the spatial distribution of the impinging radiation; and,

c. a data processor responsive to the randomly occurring event signals for producing the data signals, the data processor including:

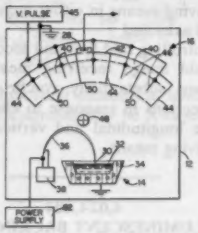
i. at least a first upstream component serially coupled to a second downstream component, each component being capable of at least storing a signal at least corresponding to an event signal, and

ii. control circuitry connected to the first and second components for advancing a stored signal from said first component toward said second component as a function of the presence of a signal in one of the downstream components and the display system, and for preventing the obliteration of a signal in said first component prior to its transfer toward said second component.

4,024,399
METHOD AND APPARATUS FOR MEASURING VAPOR FLOW IN ISOTOPE SEPARATION

George S. Janes, Lincoln, and Leonard N. Litzenberger, Andover, both of Mass., assignors to Jersey Nuclear-Avco Isotopes, Inc., Bellevue, Wash.

Filed Jan. 6, 1975, Ser. No. 538,922
Int. Cl.² H01J 39/34
U.S. Cl. 250—423 P 19 Claims



1. A system for detecting the rate of vaporization of neutral particles of a material comprising:

a vapor source generating a vapor of neutral particles of said material and having a portion of ions in the vapor particles generated from said material as a result of vaporization;

a probe positioned from said vapor source to intercept a percentage thereof, said probe comprising:

an electrode having an ion receiving surface facing the flow of vapor from said vapor source;

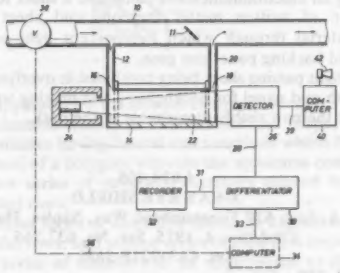
means for biasing said electrode with respect to said vapor source to provide a negative bias on said electrode which repels from said electrode negatively charged particles in the generated vapor; and

means for providing an output signal representative of the rate at which ions are collected by said electrode.

4,024,400
MONITORING METALS CONCENTRATION IN FLUID STREAMS

George C. Blytas, and Richard M. Curtis, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed May 13, 1976, Ser. No. 685,952
Int. Cl.² G01N 21/24
U.S. Cl. 250—432 R 10 Claims



1. A method for monitoring metal concentration of a fluid stream containing metals, which comprises

passing at least a portion of the said stream through a metals selective sorbent to sorb said metals, said sorbent having an X-ray mass absorbtion coefficient lower than that of the metals in said stream;

passing an X-ray beam through said sorbent;

detecting the intensity of the X-ray beam which has passed through said sorbent, to produce a detector signal in response to the intensity of said detected X-ray beam;

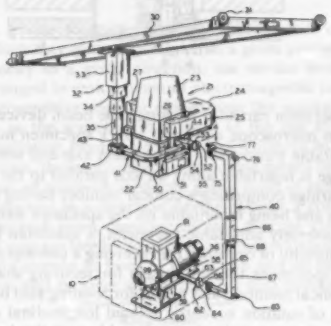
differentiating logarithmically the detector signal occurring in a predetermined time period to obtain a derivative signal related to the metal concentration in the fluid stream; and

supplying said derivative signal to information means to obtain information related to the metal concentration in said fluid stream.

4,024,401
X-RAY APPARATUS

Stanley Bernstein, Whitefish Bay; Thomas W. Lambert, Hales Corners; Philip J. Griswa, Waukesha, and Lucius Stagg, Milwaukee, all of Wis., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 632,235, Nov. 17, 1975, abandoned.
This application June 4, 1976, Ser. No. 692,866
Int. Cl.² G03D 41/16
U.S. Cl. 250—439 R 16 Claims



1. X-ray apparatus characterized by being adaptable to conduct general body examinations and coronary arteriographic examinations, comprising:

a support means that is extensible and contractible vertically and means on which said support means is mounted for movement in opposite longitudinal directions,

an arm means having first and second parts arranged at an angle to each other, the first part being attached to said support means and extending in cantilever fashion therefrom,

an image intensifier assembly disposed adjacent said parts within the angle defined thereby,

first shaft means journalled on said second arm part, said image intensifier assembly being carried on said shaft means,

X-ray source means disposed below said intensifier assembly and in substantial spaced relationship for accommodating an examination subject between them,

second shaft means on which said X-ray source means is carried, the axes of said first and second shaft means being laterally directed and parallel to each other,

means on which said second shaft means is supported and journalled,

extensible and contractible link arm means having opposed ends each of which has means for rigidly clamping to said shaft means, respectively, and for being released therefrom selectively, longitudinal movement of said cantilever arm means when said link arm means is clamped causing said link arm means to angulate and effect coordinate angulation and constant alignment of said image intensifier system and said X-ray source.

4,024,402
SPECIMEN CARTRIDGE FOR A PARTICLE BEAM DEVICE

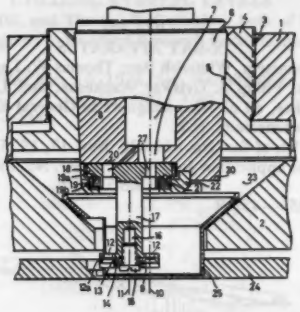
Wilhelm Schomburg, and Horst Schmidt, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 176,879, Sept. 1, 1971, abandoned. This application Sept. 9, 1975, Ser. No. 611,644

Claims priority, application Germany, Sept. 18, 1970, 2047100

Int. Cl.² G21K *5/06*

U.S. Cl. 250—442 **7 Claims**



1. Specimen cartridge for a particle beam device such as an electron microscope equipped with a specimen mount which is adjustable transversely to the beam axis and into which the cartridge is insertable along an axis parallel to the beam axis, the cartridge comprising a conical member having a longitudinal axis and being mountable on the specimen mount so as to be transversely adjustable therewith, a specimen holder having a plurality of openings for receiving a corresponding number of specimens therein, means for securing said holder to said conical member, and means for rotating said holder about an axis of rotation eccentric to said longitudinal axis so that said openings are selectively alignable with the beam axis.

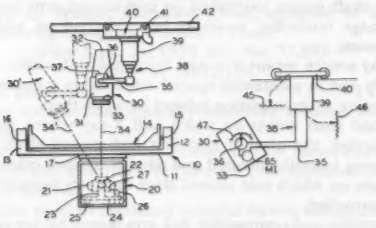
4,024,403
X-RAY CARDIOVASCULAR EXAMINATION APPARATUS

Stanley Bernstein, Whitefish Bay; Philip J. Griswa, Waukesha; Paul Halter, Jr., Brookfield, and Harold J. Kidd, Waukesha, all of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 19, 1976, Ser. No. 668,618

Int. Cl.² A61B *6/04;* **G01N** *21/34, 23/04;* **G21K** *5/06*

U.S. Cl. 250—445 R **23 Claims**



7. X-ray examination apparatus comprising:

X-ray source means and means mounting said source means for angulating about a first laterally directed axis,

first angulating motor means coupled with said source means and operative to effect angulation of said source means in either angular direction about said first axis,

another mounting means constructed and arranged for enabling longitudinal and vertical movements,

X-ray image receiving means having an image input plane to which it is desired to maintain the X-ray beam from said source means is substantial perpendicularity, said receiving means being mounted on said another mounting means for angulating about a second laterally directed axis which is not coincident with said first axis,

second angulating motor means coupled with said image receiving means and operative to effect angulation of said image receiving means in either angular direction about said second axis, and

means for controlling said first and second motor means to angulate said image receiving means and said X-ray source means substantially synchronously in opposite angular directions in response to changes in either and both of the longitudinal and vertical positions of said image receiving means.

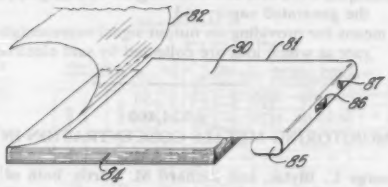
4,024,404
ELECTROLUMINESCENT BACKING SHEET FOR READING AND WRITING IN THE DARK

Becky J. Schroeder, Toledo, Ohio, assignor to Becky J. Schroeder, Toledo, Ohio

Continuation-in-part of Ser. No. 567,397, April 11, 1975, Pat. No. 3,978,340, which is a continuation-in-part of Ser. No. 498,705, Aug. 19, 1974, Pat. No. 3,879,611, which is a continuation-in-part of Ser. No. 428,339, Dec. 23, 1973, Pat. No. 3,832,556, which is a continuation of Ser. No. 288,148, Sept. 11, 1972, abandoned. This application Dec. 9, 1975, Ser. No. 639,200

Int. Cl.² F21K *2/00*

U.S. Cl. 250—462 **18 Claims**



1. A planar luminescent backing assembly for making readable matter visible in the dark comprising;

a light emitting phosphorescent backing member comprising an electroluminescent panel and a sheet for application of written matter thereon, said sheet being of material through which luminescent light emitted by said backing panel can pass,

said light passing sheet being combined in overlying relation with said panel for backlighting and making written matter thereon visibly discernable in the dark.

4,024,405
X-RAY EYE SHIELD

Frank A. Szot, 630 Fountainhead Way, Naples, Fla. 33940

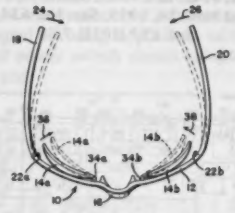
Filed Dec. 4, 1975, Ser. No. 637,765

Int. Cl.² G21F *3/00*

U.S. Cl. 250—516 **5 Claims**

1. An X-ray eye shield for use during dental radiography comprising a radiolucent frame adapted to fit the contours of the head and two radiopaque lens cups attached to said frame in a manner which will bring the lens cups into conformity over the eye sockets when the shield is placed on the head of the patient, said lens cups being attached to said frame by passive hinges which permit adjustment of said lens cups into conformity over the eye sockets after the frame has been placed on the head of the patient, and being made of a mate-

rial which effectively prevents passage of X-ray radiation, but X-ray radiation otherwise not being occluded by said eye



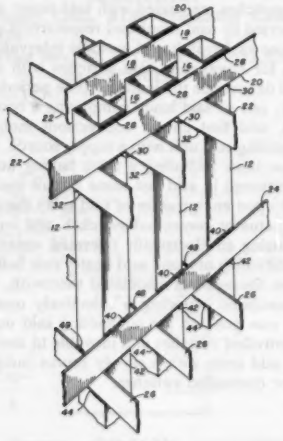
shield so that the important anatomical landmarks necessary for accurate dental diagnosis may be X-rayed without distortion.

4,024,406

SPENT FUEL STORAGE IMPROVEMENT

Frank Bevilacqua, Windsor, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Feb. 17, 1976, Ser. No. 658,649
Int. Cl.² G21C *11/00*; G21F *5/00*
U.S. Cl. 250—518 **13 Claims**



1. An apparatus for the safe yet compact storage of a plurality of fissionable masses of uniform size and shape, said fissionable masses having lateral cross-sections which fit within the confines of a polygon, wherein the apparatus comprising:

a. a first series of structural members aligned in spaced parallel rows;

b. a second series of structural members aligned in spaced parallel rows, said second series of members crossing said first series of members at an angle equal to the angle between two non-parallel sides of said polygon, said first and second series of spaced crossed members forming a plurality of passages transverse to said first and second series of members; and

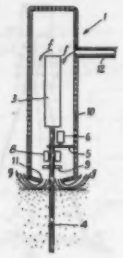
c. a plurality of discrete neutron absorbing shields, each one of which is adapted to perimetrically encircle one of said plurality of fissionable masses, each of said discrete neutron absorbing shields being positioned in one of said plurality of passages and being rigidly fastened to one member of said first series of members and one member of said second series of members.

4,024,407

DEVICE FOR MEASURING THE DUST CONTENT OF A GAS STREAM

Jean-Paul Meric, and Raymond Peltier, both of Paris, France, assignors to Centre d'Etudes et de Recherches de l'Industrie des Liants Hydrauliques, Paris, France

Filed May 15, 1975, Ser. No. 577,798
Claims priority, application France, May 20, 1974, 74.17446
Int. Cl.² G01N *21/26*
U.S. Cl. 250—574 **8 Claims**



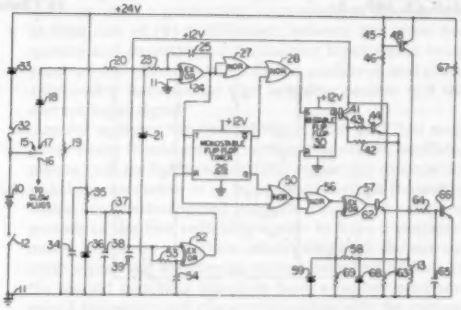
1. In a device for measuring the dust content of a gas stream, which may contain dust and has a given average circulation velocity in a given direction, the device including a source arranged to emit a beam of electromagnetic radiation, and a photosensitive receiver placed near the source, on the same side as the source with respect to the gas stream, to measure radiation from the source backscattered by dust in the gas stream, the improvement comprising means for directing a stream of relatively dust-free gas in front of said source and said receiver in a direction having at least a component opposite to said given direction of said average circulation velocity of said gas stream so as to cause accumulation of dust in form of a curtain in front of the device and an increasing output from said receiver with increasing dust content.

4,024,408

MINIMUM START TIMER FOR STARTING A DIESEL ENGINE

Donald F. Coleman, Dunlap, and Richard H. Hoerr, Morton, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 8, 1975, Ser. No. 575,850
Int. Cl.² F02N *11/08*
U.S. Cl. 290—37 R **18 Claims**



1. A control circuit for the start motor of a diesel engine, comprising: an operator actuated start switch; a timer initiated by actuation of said start switch and having an output with a minimum duration independent of the time for which the start switch is actuated; and a start motor circuit energized by the output of said timer; and a circuit for providing a time delay between the operator actuated start switch and the timer, to

avoid false operation of the start motor circuit in the event of chatter of the start switch.

4,024,409

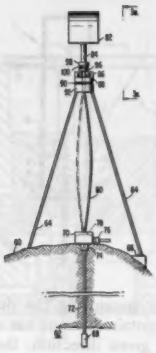
AEOLIAN WINDMILL

Peter R. Payne, Rte. 5, Box 282, Annapolis, Md. 21401

Filed Jan. 7, 1975, Ser. No. 539,142

Int. Cl.² F03D 5/06

U.S. Cl. 290—55 7 Claims



1. Apparatus for generating energy from a source of fluid in motion comprising:

means disposed in said fluid for oscillating in response to the dynamic forces of the motion of the fluid moving past it, said means comprising a flexible cylindrical cable; and

means operably coupled to said oscillating means for converting said oscillations into usable energy, said converting means comprising at least a pair of permanent magnets located on either side of the flexible cable and perpendicular to the oscillations of said cable.

4,024,410

ALTERNATING CURRENT ENERGY CONVERTER

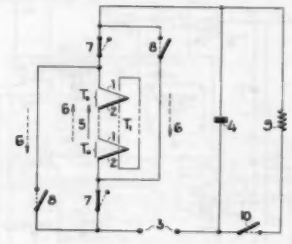
Reinhard Dahlberg, Innere Bergstrasse 32, 7101 Flein, Germany

Filed Feb. 19, 1975, Ser. No. 550,941

Claims priority, application Germany, June 5, 1974, 2427060

Int. Cl.² H02J 3/02

U.S. Cl. 307—2 16 Claims



1. An alternating current energy converter in which a direct energy converter is connected into an alternating current circuit, in which means are provided by which a current flows as a rectified current through the electrical internal resistance of said direct energy converter and in which a reactance is provided for limiting the current in said alternating current circuit.

4,024,411

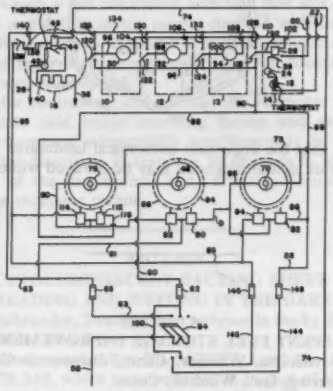
APPARATUS FOR CONSERVING ELECTRICAL ENERGY

Jose' E. Bengoa, P. O. Box 9943, Santurce, P.R. 00908

Filed Nov. 24, 1975, Ser. No. 634,645

Int. Cl.² H01H 7/00

U.S. Cl. 307—41 3 Claims



1. Apparatus for automatically controlling the "On-Off" time periods of operation of a plurality of electrical loads comprising an electrically operated rotatable timer device, a plurality of switches associated with said timer, a plurality of actuators carried by said timer and respectively positioned to open and close said switches at periodic intervals, first circuit connections for connecting said switches with said loads to energize and deenergize the loads for time periods determined by the timer, one of said loads comprising a room air-conditioning unit, said first circuit connections including circuit means connecting said unit with a supply source, and said first circuit connections including a relay having normally open contacts positioned in said last name circuit means arranged to be closed upon energization of said relay during closing of one of said actuator controlled switches, and another of said loads comprising an electrically operated water heater unit, said air conditioning unit and said heater unit being controlled by respective thermostats associated therewith, the said first circuit connections including a selectively operable switch movable to one position for connecting said units with said actuator controlled switches and movable to another position to connect said units with a supply source independently of said actuator controlled switches.

4,024,412

BURNER CONTROL SYSTEM WITH PRIMARY SAFETY SWITCH

Robert Bruce MacAskill, Jr., Rockford, Ill., assignor to The Scott & Fetzer Company (France Division), Westlake, Ohio

Filed Feb. 7, 1975, Ser. No. 547,902

Int. Cl.² H01H 37/00

U.S. Cl. 307—117 6 Claims

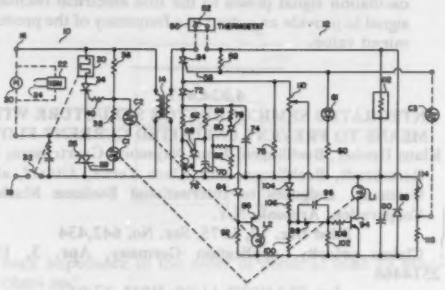
1. A fail-safe operative electrical power circuit for energizing a load comprising:

a power switch means for alternately connecting and disconnecting an electrical power source to a load in response to a turn-on signal and a turn-off signal applied to said power switch means;

a circuit breaking means operable to electrically disconnect said power source from said power switch means and said load in response to a trip current;

an electronic switch means in electrical series relationship with said power switch means operable to apply said trip current to said circuit breaking means, said electronic switch means having a control input for switching said

electronic switch means between a conducting condition and a nonconducting condition, said trip current being applied to said circuit breaking means when said electronic switch means is in said conducting condition and said off signal is being applied to said power switch means, said power switch means being in a conducting condition; and



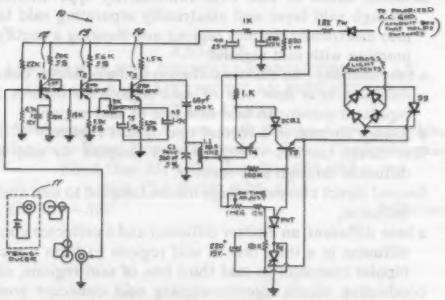
input means electrically connected to said control input for switching said electronic switch means to a nonconducting condition when said turn-on signal is applied to said power switch means.

4,024,413

SENSALIGHT

Stephen Gregory Ollta, 4134 Friendship Lane, Memphis, Tenn. 38138

Filed Nov. 17, 1975, Ser. No. 632,524
Int. Cl.² H01H *37/00*
U.S. Cl. 307—117 **1 Claim**



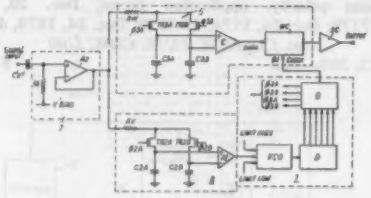
1. In an electrical circuit, the combination of means whereby a resident jingles his keys outside of his home, and said means turns on an outside light of said home so that said resident more easily finds a door key hole, and said means turns on lights or appliances inside said home, said means incorporating a transducer mounted next to a doorbell for receiving sound waves of said jingling keys and converting said sound waves into electrical pulses wherein said circuit includes three stages for (amplifying) said pulses and a capacitor and (inductor) through which all said frequency pulses, except 38.5 KHZ is sent to a ground of said circuit wherein the 38.5 KHZ frequency component is passed to a base of a transistor, T4 which pulses a gate of a (semiconductor,) SCR1 which latches on through transistor T5 and supplies continuous gate to a (semiconductor) SCR3 to turn on said lights and wherein said T4 transistor also supplies a continuous gate to (semiconductor) SCR2 for timing said circuit, said circuit further including a PUT device which turns on when its anode voltage rises above its gate voltage, thus taking the base of said T5 transistor down, and thus (turning) off said T5 transistor, (semiconductors) SCR1, SCR2, SCR3 and said lights.

4,024,414

ELECTRICAL CIRCUIT MEANS FOR DETECTING THE FREQUENCY OF INPUT SIGNALS

George W. Gurry, Witham, England, assignor to Bertram Frederick McCarthy, Witham, England

Continuation of Ser. No. 519,741, Oct. 31, 1974, abandoned.
This application May 10, 1976, Ser. No. 684,898
Claims priority, application United Kingdom, Oct. 31, 1973, 50666/73
Int. Cl.² H03K *5/20*
U.S. Cl. 307—233 R **19 Claims**



1. An electrical circuit for detecting input signals having a frequency which lies within a predetermined range of frequencies, the circuit comprising:

first sampling means having a first input means and a switching input means;

second sampling means having a first input means and a switching input means;

means for applying same input signals to each of said first input means of said first and second sampling means;

oscillator means having a control signal input means, first output means and second output means for generating in operation first switching signals at its said first output means and second switching signals at its said second output means, these first and second switching signals each having a given frequency which bears a predetermined relationship with a current input signal having a frequency within the predetermined range of frequencies;

means for applying the first switching signals from said oscillator means to said switching input means of said first sampling means, said first sampling means being responsive in operation to an input signal applied to said first input means thereof and the first switching signals applied to said switching input means thereof for admitting an input signal thereto for first sampling periods whose frequency has a predetermined relationship with the given frequency and is within the predetermined range of frequencies and for generating a control signal representing at least one of (1) a difference between the given frequency and frequency of the current input signal being received and (2) a departure from a predetermined phase relationship between the first sampling periods and the current input signal;

means for applying the control signal from said first sampling means to said control input means of said oscillator means, said oscillator means being responsive to a control signal representative of an input signal having a frequency within the predetermined range to cause first sampling periods of the first switching signals to have a predetermined frequency and phase relationship with the current input signal and for causing second sampling periods of the second switching signals to have a further predetermined frequency and phase relationship with the current input signal; and

means for applying the second switching signals to said switching input means of said second sampling means, said second sampling means being responsive in operation to signals from said oscillator second output means establishing the second sampling periods having the further predetermined frequency and phase relationship to

the current input signal and responsive to the input signal being above a predetermined value for generating an output signal from said second sampling means representing detection of an input signal within the predetermined range of frequencies.

4,024,415

DETECTING DEVICE FOR DETECTING BATTERY OUTLET VOLTAGE

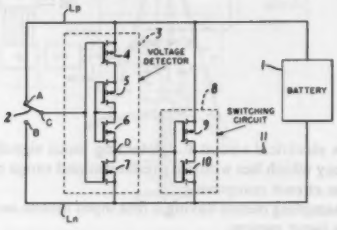
Yoshiaki Matsuura, 14-1, 2-chome, Yashiki, Chiba Narashino, Japan

Filed Dec. 19, 1975, Ser. No. 642,339

Claims priority, application Japan, Dec. 20, 1974, 49-147279; Dec. 24, 1974, 49-4090; Dec. 24, 1974, 49-4091

Int. Cl.² H03K *13/18*; **G04C** *5/00*

U.S. Cl. 307—362 **5 Claims**



1. A detecting device for detecting the output voltage of a battery or cell comprising: voltage detecting means connectable to a battery whose output voltage is to be detected and including at least a pair of MOS transistors connected in a series such that at least one of said MOS transistors shifts to its conducting state in response to the battery output voltage falling below a predetermined value thereby providing one output signal indicative of adequate battery output voltage and shifts to its nonconducting state in response to the battery output voltage being above said predetermined value thereby providing another output signal indicative of unacceptably low battery output voltage; and a switching circuit comprised of a complementary MOS inverter connected to receive the output signals derived from said voltage detecting means and operative to switch states in response thereto to provide corresponding inverted output signals indicative of the battery output voltage level.

4,024,416

METHOD FOR CONTROLLING FREQUENCY OF ELECTRICAL OSCILLATIONS AND FREQUENCY STANDARD FOR ELECTRONIC TIMEPIECE

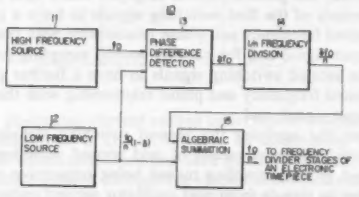
Hiro Fujita, Sayama; Shigeru Morokawa, Higashiyamato, and Akira Tsuzuki, Tokyo, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed May 10, 1976, Ser. No. 685,192

Claims priority, application Japan, June 5, 1975, 50-67819

Int. Cl.³ H03K *3/353*, *1/17*

U.S. Cl. 307—269 **22 Claims**



1. A method for controlling the frequency of first electrical oscillation signals at a predetermined value, comprising the steps of:

generating a second electrical oscillation signal at a frequency higher than the predetermined frequency of the first electrical oscillation signal, generating a train of phase difference signal pulses of which the frequency depends on the frequency departure of said first electrical oscillation signal pulses to the first electrical oscillation signal to provide an output at a frequency of the predetermined value.

4,024,417

INTEGRATED SEMICONDUCTOR STRUCTURE WITH MEANS TO PREVENT UNLIMITED CURRENT FLOW

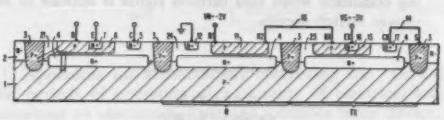
Klaus Heuber, Boeblingen; Knut Najmann, Gaertringen; Rolf Remshardt, Boeblingen, and Klaus Tertel, Altdorf, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,434

Claims priority, application Germany, Apr. 3, 1975, 2514466

Int. Cl.² H02H *11/00*; **H01L** *27/04*

U.S. Cl. 307—303 **1 Claim**



1. An integrated semiconductor structure comprising a semiconductor substrate of a first conductivity type,

an epitaxial layer of a second conductivity type on said substrate and forming a rectifying junction therewith,

isolation zones of said first conductivity type extending through said layer and electrically separating said layer into electrically distinct regions and forming a rectifying junction with said regions,

a base diffusion, an emitter diffusion and a collector contact diffusion in a first one of said regions to form a first bipolar transistor in said first one of said regions

a resistor formed in a second one of said regions,

first direct current voltage means coupled to said base diffusion through said resistor,

Second direct current voltage means coupled to said emitter diffusion,

a base diffusion, an emitter diffusion and a collector contact diffusion in a third one of said regions to form a second bipolar transistor in said third one of said regions, and

conductive means interconnecting said collector contact diffusion of said first bipolar transistor to said isolation zones to reverse bias said rectifying junction between said isolation zones and said regions to prevent unlimited current flow via said isolation junction when supply voltages are applied to the integrated structure.

4,024,418

INTEGRATED CIRCUIT CMOS INVERTER STRUCTURE

Rainer Hankel, Berlin, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 4, 1976, Ser. No. 655,074

Claims priority, application Germany, Mar. 15, 1975, 2511488

Int. Cl.³ H03K *19/08*, *19/40*; **H01L** *29/78*

U.S. Cl. 307—304 **6 Claims**

1. Integrated circuit inverter structure comprising

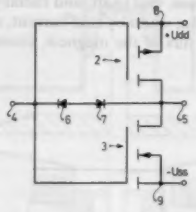
a. semiconductor chip (11);

two complementary MOS transistors (2, 3) formed on the chip, each having a control electrode and a drain electrode, the control electrodes of the transistors being connected together and forming the input (4) of the

inverter and the drain electrodes of the transistors being connected together and forming the output (5) of the inverter,

and comprising in accordance with the invention

a high-resistance independent feedback circuit connected only to the inverter output (5) and to the inverter input (4) to stabilize the working point thereof having a feed-



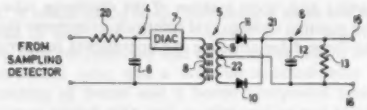
back impedance in the order of about at least 10 Megohms and

formed by two oppositely poled, serially connected semiconductor diodes (6, 7), in which their common terminals comprise a single unconnected electrode, integrated with the transistors (2, 3) on the same semi-conductor chip (11) to form a common integrated inverter structure on a single chip substrate.

4,024,419
APPARATUS FOR DIGITALLY MONITORING AN ANALOG PARAMETER OF AN INDUSTRIAL INSTALLATION

Jurij Sirokorad, and Jiří Večera, both of Brno, Czechoslovakia, assignors to Prvni Brnenska strojirna, Brno, Czechoslovakia

Filed May 25, 1976, Ser. No. 689,903
Int. Cl.² H03K *3/26, 1/16*
U.S. Cl. 307—308 **3 Claims**

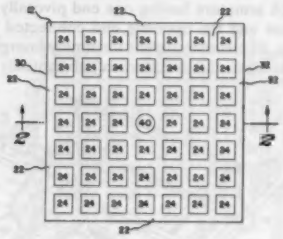


1. In an apparatus for digitally monitoring an analog operating parameter of an industrial installation, sensing means coupled to the installation and repetitively operable for generating a succession of relatively long constant-duration first pulses each having an amplitude proportional to the then-occurring value of the operating parameter, a capacitor, means for coupling the output of the sensing means across the capacitor to charge the capacitor, a capacitor discharge circuit including a two-terminal, threshold-operated negative resistance electronic element coupled to the capacitor for effecting discharge of the capacitor in the form of a plurality of relatively short duration, constant-amplitude second pulses occurring over the duration of each first pulse, the number of second pulses occurring during each first pulse being proportional to the amplitude of such first pulse, and means coupled to the output of the discharge circuit for rectifying the successive second pulses.

4,024,420
DEEP DIODE ATOMIC BATTERY

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed June 27, 1975, Ser. No. 590,866
Int. Cl.² G21D *7/00*
U.S. Cl. 310—3 B **47 Claims**



1. A deep diode atomic battery comprising:

a body of single crystal semiconductor material having a preferred crystallographic structure, a vertical axis, first and second major opposed surfaces, a peripheral side surface, a selected resistivity and a first type conductivity;

at least one of the major opposed surfaces having a preferred planar orientation which is one selected from (111), (110) and (100);

a plurality of regions of second and opposite type conductivity and a selected resistivity disposed in the body;

each region having a preferred crystallographic orientation and extending substantially parallel to a preferred axis of the crystallographic structure between, and terminating in, the two major opposed surfaces and having two opposed end surfaces;

one of the two end surfaces of each region is coextensive with one of the major surfaces;

the other end surface of each region is coextensive with the other one of the major opposed surfaces;

the material of each of the second regions being of recrystallized semiconductor material of the body having solid solubility of a dopant material therein to impart the second type conductivity and selective level of resistivity thereto;

the dopant material being substantially uniformly distributed throughout the second region, its solid solubility and its concentration being determined by a selected temperature range at which it was distributed within the region when migrated therethrough;

a P-N junction formed by the contiguous surfaces of the materials of each region and the body;

means for electrically connecting the first regions into a first internal electrical circuit arrangement;

means for electrically connecting the second regions into a second internal electrical circuit arrangement;

means for disposing a radioactive source within the body in a predetermined relationship with the first and second regions.

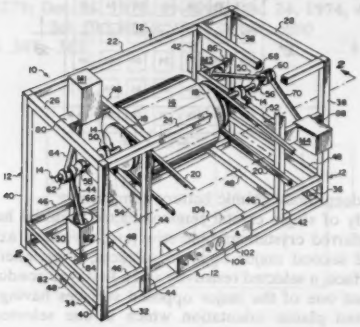
4,024,421
MAGNETICALLY OPERABLE ENGINE OR POWER PLANT

Benjiman R. Teal, 611 Marion St. NW., Madison, Fla. 32340

Filed Mar. 24, 1976, Ser. No. 669,900
Int. Cl.² H02K *7/06*
U.S. Cl. 310—24 **2 Claims**

1. A magnetically operated power plant comprising a work frame, an axially extended crank shaft rotatably mounted on said frame, a pair of spaced bearings one on each side of the frame for supporting a crank shaft, a fly wheel mounted on the

crank shaft between the said spaced bearings, a crank arm fixed to each end of the crank shaft adjacent the said bearings and substantially 180° apart and on the opposite side of the bearings from the fly wheel, a pair of spaced hollow electro-magnets positioned substantially diametrically opposite each other at each side of the frame and in substantially the same plane with the crank arm and perpendicular to the axis of the crank shaft, an armature for each electro-magnet adapted to slide within each of the hollow electro-magnets, a connecting rod for each armature having one end pivotally connected to the armature and the opposite end connected to one of the crank arms, an electric current for timely energizing the electro-magnets when the armature is substantially adjacent one



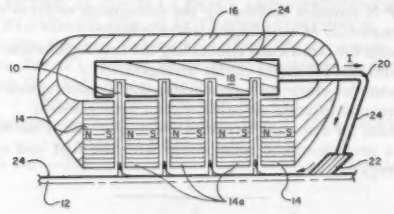
end of the electro-magnet, a timing means comprising a micro-switch for each electro-magnet fixedly mounted on said frame work, each switch including a pair of normally open contacts and disposed in series relation with said electro-magnet, said switch being disposed in circumferential spaced relationship about the crank shaft, means carried at each end of the fly-wheel for closing each of the said switches progressively on alternate sides of the frame to the respective electro-magnets in the direction of the operated crank shaft substantially at the time the solenoid is at one end of the electro-magnet, the electro-magnets of each pair having their axes slightly inclined at an angle to each other whereby the associated crank arms are minimized.

4,024,422

HOMOPOLAR MOTOR-BATTERY

George Herbert Gill, Box 228, Wyandotte, Okla. 74730

Filed Mar. 18, 1976, Ser. No. 668,339
Int. Cl.² H02K *31/04*
U.S. Cl. 310—178 12 Claims



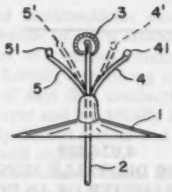
1. A homopolar motor-battery comprising:
an electrically conductive shaft;
a plurality of electrically conductive disks mounted fixedly, coaxially on said shaft;
a plurality of permanent magnets mounted coaxially upon said shaft alternately between and at the end of said disks, with the magnetic axis of said disks parallel to said shaft and series aiding;
a yoke of magnetic material connected to said magnets at the end of said disks to complete the magnetic flux path;
an electrochemically reactive, conductive shroud member within said yoke in close proximity to and enclosing the rims of said conductive disks;
means for completing an electrical circuit between said shroud member and said shaft such that, when said motor-battery is immersed in an electrolyte, said shroud member and conductive disks form the cathode and anode members, respectively, of an electric battery causing current to flow through said shroud member, said completing means, said shaft, and radially outward to the rims of said disks, whereby said current, reacting with the axial magnetic flux of the magnets, causes said disks and shaft to rotate.

4,024,423

ELECTRIC DISCHARGE TUBE HAVING VARIABLE ELECTRODE AREA

Edmund R. Kern, Hampton, N.H., assignor to North American Philips Corporation, New York, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,956
Int. Cl.² H01J *1/02*
U.S. Cl. 313—147 2 Claims



1. A discharge tube comprising two opposite electrodes, at least one wire probe located within said tube and electrically connected to each electrode, a temperature sensitive bimetallic support for each probe, said support being adjusted in its cool condition for placing said probe in a position remote from said electrode to reduce the effective area thereof for easy starting and, upon ignition of the discharge tube, in an operative position close to said electrode to increase the effective area thereof for affecting the operational temperature.

4,024,424

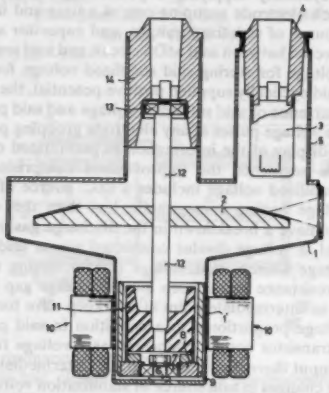
ROTARY-ANODE X-RAY TUBE

Harry Eggelsmann, and Claus Peter Hodum, both of Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,587
Claims priority, application Germany, Nov. 27, 1974, 2455974
Int. Cl.² H01J *35/04*
U.S. Cl. 313—60 7 Claims

1. An X-ray tube comprising an envelope, and, within the envelope, a rotary anode including a shaft adapted for connec-

tion to a high potential, a rotor concentrically arranged around a portion of said shaft, an insulating member connecting the inner wall of said rotor to said shaft portion, and a stator separated from said rotor by a minimum gap.



4,024,425

METAL HALIDE LAMPS

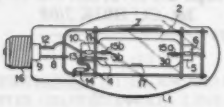
Tadatoshi Higashi; Mitsunori Yoshimoto, both of Yokohama; Mituharu Hagiwara, and Toshihiko Ishigami, both of Tokyo, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 6, 1975, Ser. No. 629,216

Claims priority, application Japan, Nov. 11, 1974, 49-128955; June 12, 1975, 50-70157; Oct. 1, 1975, 50-117644

Int. Cl.² H01K *1/52*

U.S. Cl. 313—174 9 Claims



1. A metal halide lamp comprising a luminous sealed tube, a pair of main electrodes disposed in said luminous sealed tube, rare gas, mercury and metal halide sealed in said luminous sealed tube, and a material selected from the group consisting of boron and a boron compound sealed in said luminous sealed tube and so disposed as not to contact any exposed surface of said pair of main electrodes whereby corrosion by halogen of the exposed surfaces of said pair of main electrodes is prevented.

4,024,426

STANDING-WAVE LINEAR ACCELERATOR

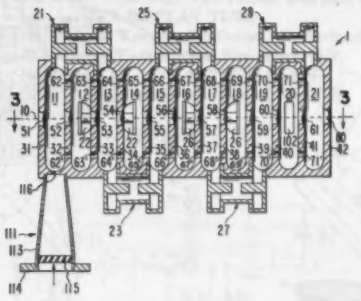
Victor A. Vaguine, Palo Alto, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 420,754, Nov. 30, 1973, abandoned. This application Feb. 3, 1975, Ser. No. 546,379

Int. Cl.² H01J *25/10*

U.S. Cl. 315—5.41 14 Claims

1. A charged particle standing wave accelerator comprising wall means forming at least three accelerating cavities, each said accelerating cavity being adapted to support a standing wave therein, said wall means having apertures between adjacent cavities to permit passage of a charged particle beam along a path through said accelerating cavities, coupling means directly interconnecting two of said accelerating cavities which are not adjacent to each other and adapted to cause a phase difference in said two cavities, said coupling means being disposed from said beam path and having no coupling connection to any accelerating cavity between said two accelerating cavities, at least a third accelerating cavity positioned between said two accelerating cavities, means for driving one of said two accelerating cavities with a source of electromagnetic wave energy, and means other than said beam for driving said third accelerating cavity with a source of electromagnetic wave energy which can have a selected phase relation to said source for driving one of said two cavities; whereby said two accelerating cavities form a first accelerating cavity substructure, said third accelerating cavity forms a second accelerating cavity substructure, and said two substructures can be energized with input waves having a selected phase relation to each other.



4,024,427

DEGAUSSING CIRCUIT

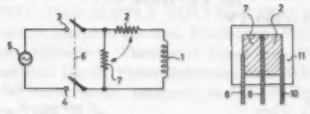
Charles Belhomme, Brussels, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,576

Claims priority, application Netherlands, Dec. 16, 1974, 7416329

Int. Cl.² H01F *13/00;* H01C *7/02*

U.S. Cl. 315—8 7 Claims

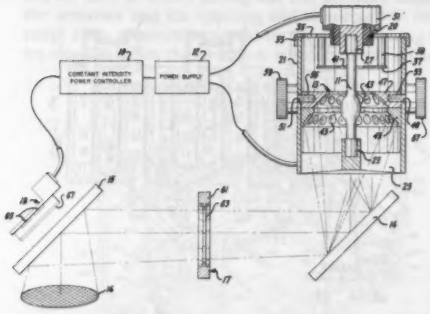


1. A degaussing circuit comprising the series arrangement of a degaussing coil and a first thermistor having a positive temperature coefficient, only a second thermistor having a positive temperature coefficient thermically coupled to the first thermistor and electrically parallel coupled to said series arrangement, both of said thermistors having different Curie points, means for applying an alternating current voltage to said thermistors, said voltage being substantially the same a substantial time after said application, the resistance value of the second thermistor at a higher temperature than the highest of the Curie points being lower than the resistance value of the first thermistor at the same temperature, and the resistance value of the second thermistor before said alternating current voltage is applied being higher than the resistance value of the first thermistor.

4,024,428
RADIATION-SENSITIVE CONTROL CIRCUIT FOR DRIVING LAMP AT VARIOUS POWER LEVELS

Gerald Bachur, San Jose, and George E. Richardson, Santa Clara, both of Calif., assignors to Optical Associates, Incorporated, Santa Clara, Calif.

Filed May 19, 1975, Ser. No. 578,915
Int. Cl.² H05B 41/38; G03B 27/78
U.S. Cl. 315—151 9 Claims

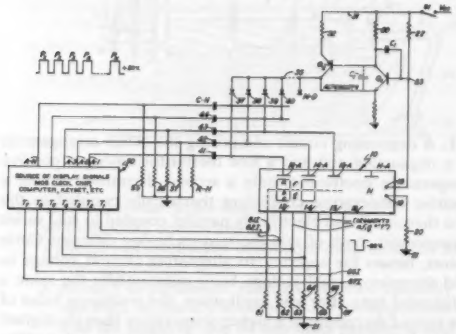


1. An exposure system comprising a lamp, a power supply for driving said lamp at an idle level which optimizes the life of said lamp, means for driving light from said lamp through a light path to an exposure plane, exposure means for controlling the exposure period during which light at a preselected level from said lamp reaches the exposure plane, light detector means in the light path coordinated with said exposure means for detecting the light intensity from said lamp during the exposure period, and a control circuit connected to said power supply, said control circuit being responsive to said light detector for adjusting said power supply to provide the preselected level of light output from said lamp during the exposure period, said control circuit including means for reducing the power to said lamp below the idle level, means for increasing the power to said lamp above the idle level, and a summing circuit connected to said light detector for producing an output to cause a reduction or an increase in the power to said lamp.

4,024,429
OPERATING VOLTAGE SUPPLY SYSTEM FOR GAS DISCHARGE DISPLAY PANEL

David Glaser, Warren, N.J., assignor to Panel Technology, Inc., Lewistown, Pa.

Filed Oct. 6, 1975, Ser. No. 619,990
Int. Cl.² H05B 41/14
U.S. Cl. 315—169 TV 3 Claims

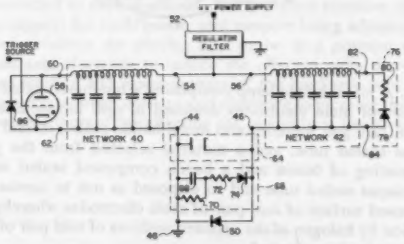


1. In a gas discharge display panel system having a plurality of electrode groupings constituting a corresponding number of character display positions, each electrode grouping including a plurality of cathode electrode segments and an anode electrode, MOS circuit means for supplying a low voltage negative potential to permutated ones of said cathode segments and cyclically supplying a positive potential to the anode of each electrode grouping one at a time and in a sequence, a source of stabilized voltage, and capacitor storage means connected between said MOS circuit and said source of stabilized voltage for storing said stabilized voltage for summing with said cyclically supplied positive potential, the simultaneous occurrence of said stabilized voltage and said positive and negative voltage pulses at any electrode grouping producing a visual display of the information in permutated ones of said cathode segments, the improvement comprising said source of stabilized voltage includes a D.C. source of direct current voltage having a magnitude less than the voltage needed to achieve a breakdown in the discharge gas medium in said panel, a voltage divider connected across said direct current voltage source, said voltage divider having serially connected resistance and a keep alive discharge gap in said panel, with an intermediate point at said keep alive for developing a voltage proportional to a condition in said panel, a NPN-PNP transistor couple connected as a voltage follower having the input thereof connected to said intermediate point for tracking changes in said source of stabilization voltage and providing a high current gain and isolating said electrode grouping from said source of stabilized voltage.

4,024,430
MODULATOR AND CLAMPER FOR VARIABLE IMPEDANCE LOAD

Sol Schneider, Little Silver, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 29, 1975, Ser. No. 617,881
Int. Cl.² H03K 5/08
U.S. Cl. 315—289 10 Claims



7. In combination,

a cold cathode E-beam gun having an impedance that decreases to a predetermined low level upon application of a pulse of a predetermined rated voltage,

a transformerless Blumlein circuit connected to the terminals of the E-beam gun and having total impedance that is substantially equal to said predetermined low level for providing power pulses at approximately twice the rated voltage, and

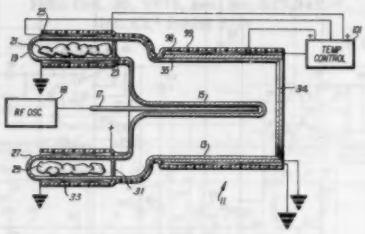
a clamper circuit connected across the terminals of the E-beam gun for limiting the forward voltage applied across the E-beam gun to approximately rated voltage and that has an impedance substantially the inverse of the E-beam gun during a pulse.

4,024,431

RESONANCE METAL ATOM LAMP

Robert A. Young, Loretto, Canada, assignor to Xonics, Inc., Van Nuys, Calif.

Filed June 23, 1975, Ser. No. 589,699
Int. Cl.² H05B 41/24
U.S. Cl. 315—248 16 Claims



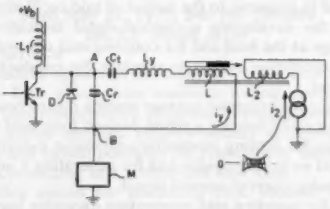
1. A resonance lamp comprising
a dielectric closed body having a predetermined vacuum therein;
a reentrant coaxial hollow glass element integral within said body and extending from one end thereof substantially the length of said body;
an electrical conductor within said element;
an ultraviolet transparent window at the other end of said body;
two hollow arms integral with and extending from said body;
a high purity rare gas filling within said body at a pressure of 1 to 10 torr;
a source of metal atoms in one of said arms;
an electrically conductive sheathing adjacent said glass body;
a getter in the other said arm for removing gases from said body;
a means for heating the main body of said housing; and
means for heating said one arm, with the temperature in said main body higher than the temperature in said one arm.

4,024,432

CIRCUIT ARRANGEMENT IN AN IMAGE DISPLAY APPARATUS FOR (HORIZONTAL) LINE DEFLECTION

Antonius Boekhorst, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 22, 1975, Ser. No. 598,014
Claims priority, application Netherlands, Aug. 19, 1974, 7411046
Int. Cl.² H01J 29/56
U.S. Cl. 315—371 8 Claims



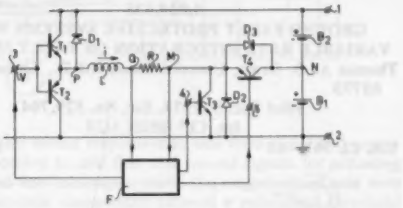
1. Circuit arrangement for use with a line deflection coil, said circuit comprising a generator means adapted to be coupled to said coil for producing a sawtooth line-deflection current through said line deflection coil, said deflection current having a field-frequency component current, a horizontal linearity correction coil adapted to be coupled in series with said deflection coil and including an inductor having a bias-magnetized core, and means for making the inductance value of the linearity correction coil substantially independent of the field frequency component current.

4,024,433

CIRCUIT FOR GENERATING A DEFLECTION CURRENT THROUGH A COIL FOR THE VERTICAL DEFLECTION IN A DISPLAY TUBE

Jan Abraham Cornelis Korver, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 17, 1975, Ser. No. 614,255
Claims priority, application Netherlands, Sept. 20, 1974, 7412438
Int. Cl.² H01J 29/70, 29/76
U.S. Cl. 315—397 8 Claims



1. A circuit for generating a saw-tooth deflection current having a scan and a flyback period from a first voltage source having two terminals through a coil for the vertical deflection of a cathode ray in a display tube, said circuit comprising an output amplifier that has zero power dissipation during the retrace period and including input and output terminals, means for applying control signals to said output amplifier input terminal the deflection coil having a first end being adapted to be connected to said output terminal, and switching elements means for coupling during the scan period the second end of the deflection coil to said first terminal of said voltage source and for coupling during the flyback period said second end of the deflection coil to the second terminal of the voltage source.

4,024,434

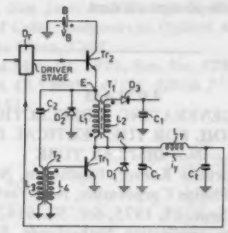
CIRCUIT ARRANGEMENT IN A TELEVISION RECEIVER PROVIDED WITH A LINE DEFLECTION CIRCUIT AND A SWITCHED SUPPLY VOLTAGE CIRCUIT

Louis Gerardus Josephus Joosten, Eindhoven; Wim Bosboom, Nijmegen; Wilhelmus Theodorus Hendrikus Hetterscheid, Nijmegen, and Gerrit Pieter Johannes Van Schaik, Nijmegen, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 11, 1975, Ser. No. 567,317
Claims priority, application Netherlands, Apr. 29, 1974, 7405726
Int. Cl.² H01J 29/74
U.S. Cl. 315—410 3 Claims

1. Circuit arrangement for a television receiver provided with a line deflection circuit means for generating a line-frequency deflection current with a trace and a retrace through a deflection coil, which circuit means includes a first switch controllable at the line frequency, and with a supply voltage circuit which is switched also at the line frequency and includes a second switch controllable at the line frequency, a diode and an inductance, across which inductance a retrace pulse is produced originating from the line deflection circuit, means for applying to the first switch a control signal originating from the supply voltage circuit, wherein the improvement

comprises a series combination of a capacitor and a primary winding of a transformer connected in parallel with the diode,



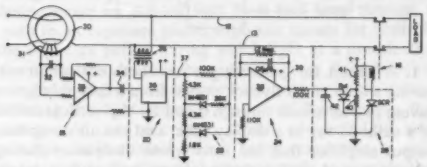
an end of a secondary winding of the transformer being connected to a control electrode of the first switch.

4,024,435

GROUND FAULT PROTECTIVE SYSTEMS WITH VARIABLE RATE INTEGRATION OF FAULT SIGNALS

Thomas A. O. Gross, Concord Road, R.F.D., Lincoln, Mass. 01773

Filed Dec. 5, 1974, Ser. No. 529,704
Int. Cl.² H02H *3/28*
U.S. Cl. 361—45 **13 Claims**



1. A ground fault protective system for use in a power distribution system for supplying a.c. power to a load from at least two supply conductors, one of such conductors being grounded at the source, comprising:

differential current sensing means responsive to currents in such supply conductors for generating ground fault characterizing signals in response to difference in currents carried by such supply conductors;

signal storage means responsive to said ground fault characterizing signals to provide an output signal which is an integral of said ground fault characterizing signals; and

variable rate signal expander means associated with said signal storage means and automatically responsive to the magnitude of said ground fault characterizing signals for causing said ground fault characterizing signals to be integrated by said signal storage means at disproportionately augmented rates in response to higher signal levels than to lower signal levels.

4,024,436

GROUND FAULT PROTECTIVE CIRCUITRY

William H. Adams, Pompey, N.Y., assignor to Syracuse Electronics Corporation Subsidiary of Pass & Seymour, Inc., Syracuse, N.Y.

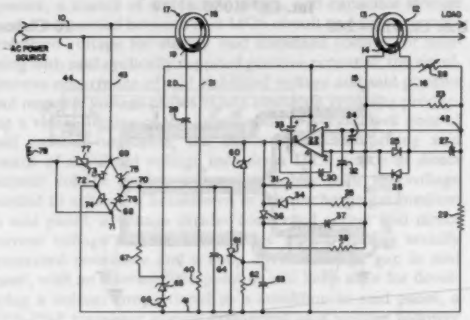
Division of Ser. No. 420,654, Nov. 30, 1973, Pat. No. 3,936,699. This application July 28, 1975, Ser. No. 599,467
Int. Cl.² H02H *3/28*
U.S. Cl. 361—45 **52 Claims**

1. A protective system for use in an electrical system having at least a first conductor and a second conductor extending from a source of alternating current to a load, said protective system comprising:

a. a differential transformer having a core, a primary formed by said at least first and second conductors, and a secondary;

b. fault responsive means;

c. an amplifier coupled to said secondary; and means to render said amplifier responsive to current flow in said secondary in such a manner that said current flow in said



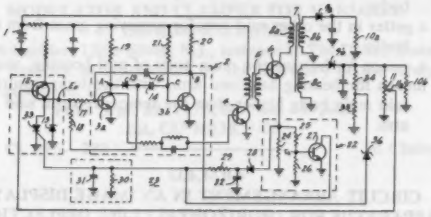
secondary is substantially independent of the permeance of the material of said core and the level at which said fault responsive means operates is substantially independent of the gain of said amplifier.

4,024,437

D.C. POWER SUPPLY CIRCUIT

Masao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 4, 1975, Ser. No. 628,743
Claims priority, application Japan, Nov. 14, 1974, 49-137823[U]
Int. Cl.² H02H *3/20*
U.S. Cl. 361—87 **5 Claims**



1. A power supply protection circuit comprising:

an oscillation circuit having means for changing its conduction angle in accordance with the magnitude of an input signal applied thereto,

a d.c. power source,

a switching device coupled to an output of said oscillation circuit for switching power from said d.c. power supply to a load in response to the output of said oscillation circuit,

means for developing a control signal indicative of the voltage at the load and for coupling said control signal to said oscillation circuit to regulate the conduction angle thereof,

a momentary excessive current sensing means coupled to a circuit point bearing a signal derived from said switching device for sensing momentary excessive current present in said switching device and for generating a momentary excessive current control signal,

means for coupling said momentary excessive current control signal to said oscillation circuit for suppressing the conduction angle thereof,

an average excessive current sensing means connected to a circuit point bearing a signal derived from said switching device for developing an average excessive current control signal,

shut-off means for turning off said oscillation circuit in

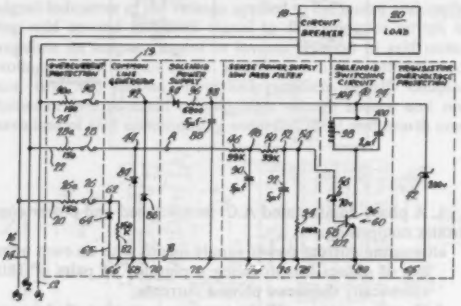
response to said average excessive current control signal, and

means for connecting said average excessive current control signal to said shut-off means.

4,024,438
DELTA PHASE LOSS DETECTOR

Robert A. Priegnitz, Algonquin, Ill., assignor to Coilcraft, Inc., Cary, Ill.

Filed Oct. 30, 1975, Ser. No. 627,345
Int. Cl.² H02H 3/24
U.S. Cl. 361—92 9 Claims



1. A circuit for sensing voltage loss or failure in any or all conductors of a multiphase conductor power supply, comprising an internal common line, like oriented diodes connecting each of said conductors to said line, a second line connecting one of said phase conductors to said common line in parallel with the diode connecting said one conductor to said common line and having therein electronic switching means with a control element, a third line connecting a second of said phase conductors to said control element in parallel with the diode connecting said second conductor to said common line, said third line developing voltage pulses therein with respect to said common line when the voltage in said third line exceeds the voltage across any of the diodes connecting the other phase conductors to said common line in the conductive direction, said pulses being proportional in amplitude and duration to said excess, filter means in said third line for converting said pulses into an averaging, approximately steady state DC, and voltage barrier means between said filter and said control element requiring more than a predetermined minimum voltage thereacross to maintain said switching means in a conductive condition.

4,024,439
PROTECTION OF POLYPHASE EQUIPMENT

James E. McClain, and Howard L. Scott, both of Greenville, Tex., assignors to Esco Manufacturing Company, Greenville, Tex.

Filed May 22, 1975, Ser. No. 580,060
Int. Cl.² H02H 3/341
U.S. Cl. 361—76 9 Claims

1. Protective apparatus for interrupting the flow of electrical power from a polyphase source to a load, comprising:

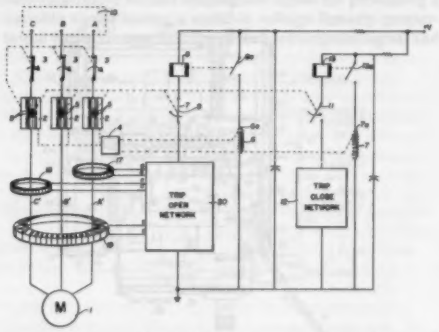
a. line interrupter means disposed in supply lines between said source and said load switchably actuated between open and closed positions for respectively disconnecting and connecting said source and said load.

b. sensing means for producing first, second, and third signals respectively representative of the positive sequence, negative sequence, and zero sequence components of the line currents in said supply lines, and

c. condition responsive network means for acutating said line interrupter means to said open position, said condition responsive network means comprising:

i. first means responsive to said second signal and nonresponsive to said first or third signals for actuating said line interrupter when the magnitude of said negative sequence component exceeds a prescribed threshold value,

ii. second means responsive to said first and second signals and nonresponsive to said third signal for actuating said line interrupter when the combination of the magnitudes of said positive and negative sequence components exceeds a prescribed threshold value, and

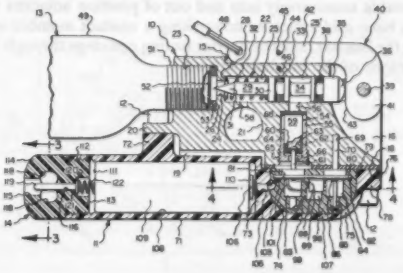


iii. third means responsive to said third signal and nonresponsive to said first and second signals for actuating said line interrupter when the magnitude of said zero sequence component exceeds a prescribed threshold value.

4,024,440
WATER ACTIVATED PRESSURIZED GAS RELEASE DEVICE

Francis M. Miller, Buffalo, N.Y., assignor to Conax Corporation, Buffalo, N.Y.

Filed Feb. 13, 1975, Ser. No. 549,723
Int. Cl.² F23Q 7/02
U.S. Cl. 361—251 14 Claims



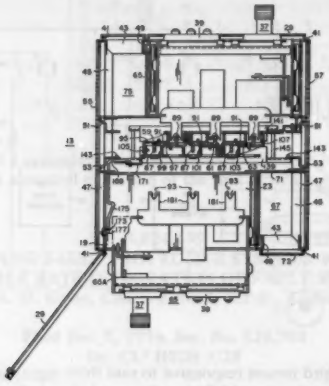
1. In a water activated device including an electrically responsive element to be electrically energized, the combination therewith of an electrical energizing circuit comprising an electrical power source, a breakdown diode having a breakdown voltage level below the voltage level of said source, spaced electrodes, conductor means connecting said element, diode and electrodes in series with each other and with said source and arranged to provide a direct series connection between said element and diode, and a capacitor electrically connected directly across such directly connected element and diode, whereby the electrical resistance afforded by water filling the space between said electrodes operates in conjunction with said capacitor to provide a time delay for charging said capacitor up to said breakdown voltage level.

4,024,441

CONTROL CENTER WITH INSULATED BUS BARS

Forrest E. Coyle, Pittsburgh, Pa.; John R. Wilson, Darien, and Brij M. Bharteey, Bolingbrook, both of Ill., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1975, Ser. No. 612,607
Int. Cl.² H02B 1/10
U.S. Cl. 361—334 11 Claims



1. A control center for distributing electric power from a power supply source to power consuming devices, comprising a cabinet having a plurality of vertical compartments on the front side of the cabinet, a plurality of vertical, horizontally spaced, bus bars in said cabinet, an electrically insulative barrier encasing the bus bars with the surfaces of each bus bar being in surface-to-surface contact with the barrier, the barrier being substantially coextensive with the bus bars and consisting of a dielectric material having good heat transfer properties, the barrier comprises a sheet-like member on each side of the spaced bus bars which members have interfitting portions including a flange-receiving groove in one member and a flange in the other member and extending between each pair of adjacent bus bars, the sheet-like members on opposite sides of the bus bars being substantially coextensive, at least one circuit interrupter structure in the compartments and movable transversely into and out of position adjacent to the bus bars, said structure comprising a contact member engaging the bus bar, and the barrier having openings through which portions of the bus bars extend.

4,024,442

CAPACITOR AND CAPACITOR ELECTROLYTE

Daniel J. Anderson, Indianapolis, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed June 9, 1975, Ser. No. 584,986
Int. Cl.² H01G 9/02
U.S. Cl. 361—322 9 Claims

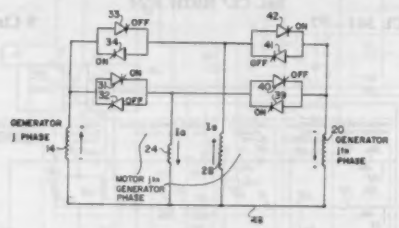
1. An electrolyte adapted for use in an electrolytic AC motor start type capacitor, the electrolyte consisting essentially of about 2 to about 30 wt.% of an acid selected from the group consisting of benzoic acid, toluic acid and mixtures thereof, about 2 to about 30 wt% of at least one tertiary aliphatic amine which at least partially neutralizes the acid, and the remainder ethylene glycol.

4,024,443

A.C.-POWERED, COMMUTATED ELECTRIC MOTOR

Donald H. Schmucker, Riverdale, and Dominic S. Toffolo, Hillcrest Heights, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 9, 1975, Ser. No. 611,733
Int. Cl.² H02P 3/76
U.S. Cl. 318—175 12 Claims



1. A phase-commutated A.C. motor speed and power controller comprising:

alternating current power supply means with an even number of phases for providing a plurality of pairs of 180° electrically displaced phased currents;

A.C. motor means with the same even number of phases as said A.C. power supply means and having at least one magnetic field pole pair and an armature with a plurality of pairs of 180 electrical degree separated phase windings;

position-sensing means for sensing the relative positions of the magnetic field pole pairs and the armature windings of said motor means;

a plurality of switching bank means with each switching bank means connecting one pair of 180° electrically displaced phase windings from said power supply means to the corresponding dedicated pair of said 180° electrically separated phase motor armature windings, each of said switching bank means including a plurality of oppositely disposed diode-like switches connected so that the alternating current from said power supply means windings flows continuously through said switching bank means and is converted into two direct current ripple voltages of opposite polarity which are applied across said motor armature windings, each of said diode-like switches having a control input to which a control signal may be applied to switch on the flow of current between an anode input and a cathode input of the diode-like switch, said current flow between the anode and cathode stopping whenever both said control signals is removed from said control input and also the voltage applied by said power supply means between said cathode and anode inputs falls to zero, said position-sensing means applying control signals to said control inputs in accordance with the relative position of the armature windings and field windings of said motor means in such a manner that the current through said armature windings always generates magnetic fields tending to force the rotor of the motor to rotate in the same direction.

4,024,444

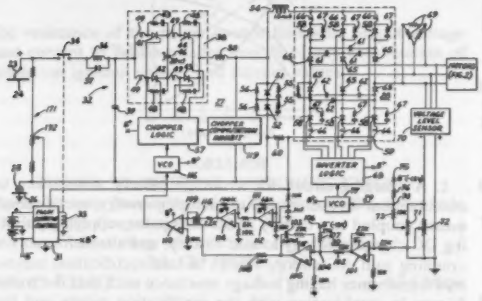
DRIVE CIRCUIT FOR INDUCTION MOTOR USED IN AIR CONDITIONING SYSTEM OF A RAILWAY VEHICLE

Shashi B. Dewan, Toronto, Canada, and Robert M. Olsen, Barrington, Ill., assignors to Vapor Corporation, Chicago, Ill.

Filed July 14, 1975, Ser. No. 595,440
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 25 Claims

1. A drive circuit for an induction motor used in an air

conditioning system of a railway vehicle operable from a source of high voltage direct current, said current comprising a chopper circuit connected to said direct current source for converting the high voltage direct current to a regulated direct current and an inverter circuit connected to the output of said chopper circuit for converting the regulated direct current into alternating current at a regulated frequency, means for applying said alternating current to the induction motor, a first feedback means for developing a first feedback signal indicative of the voltage applied to the motor and applying said first feedback signal to said inverter circuit to regulate its output frequency in a direct relation to said motor voltage, and a second feedback means for providing a second feedback signal indicative of the voltage applied to the motor and applying said second feedback signal to said chopper circuit to regulate its output current in inverse relation to said motor voltage, said chopper circuit including a commutating inductor, first and second controlled rectifiers serially coupled between one terminal of said high voltage source and one terminal of said commutating inductor, third and fourth con-



trolled rectifiers serially coupled between said one terminal of said high voltage source and said one terminal of said commutating inductor, a commutating capacitor coupled between the junction of said first and second controlled rectifiers and the junction of said third and fourth controlled rectifiers, means for coupling said inverter circuit between the remaining terminal of said commutating inductor and the remaining terminal of said high voltage source, a unidirectional current conducting device coupled between said one terminal of said commutating inductor and said remaining terminal of said high voltage source, said uni-directional current conducting device being connected so as to be back-biased by the voltage applied to said one terminal of said commutating inductor, and a control circuit means alternately rendering said first and fourth and said second and third controlled rectifiers conductive to cyclically charge said commutating capacitor in opposite directions to establish a uni-directional current through said commutating inductor, said second feedback means being connected to said control circuit means so as to regulate the frequency of the cyclical charges as an inverse function of the motor voltage.

4,024,445

CIRCUIT FOR PRODUCING FOR A FEEDBACK MOTOR SPEED CONTROL LOOP AN ERROR SIGNAL IMMUNE TO A CHANGE IN THE SOURCE VOLTAGE

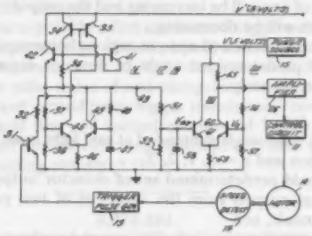
Kazuo Tokuda, Tokyo, and Hiroshi Minakuchi, Kadoma, both of Japan, assignors to Nippon Electric Company, Ltd. and Matsushita Electric Industrial Co., Ltd., both of, Japan

Filed July 7, 1975, Ser. No. 593,269
Claims priority, application Japan, July 11, 1974, 49-79952
Int. Cl.² H02P *5/16*
U.S. Cl. 318—318 **5 Claims**

1. A negative feedback circuit for generating a control signal to be applied to a control circuit for automatically controlling the actual speed of a motor, said feedback circuit being responsive to a feedback signal having a frequency representative of the actual speed of said motor, said feedback circuit comprising:

a rectangular pulse generator powered by a voltage source and responsive to said feedback signal for generating a rectangular signal having a predetermined pulse width, a pulse height linearly proportional to the voltage output of said voltage source, and a duty cycle determined by the frequency of said feedback signal;

means responsive to said rectangular signal for producing a variable signal having a variable voltage linearly proportional to an average voltage of said rectangular signal and



therefore proportional to both the actual speed of said motor and the actual voltage output of said voltage source;

a potential divider for linearly dividing the output of said source voltage to derive a reference signal indicative of a predetermined desired speed of said motor;

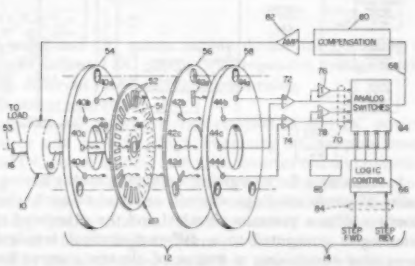
means for comparing said variable signal representative of the actual speed of said motor and said reference signal and for generating said control signal which is representative of a difference between said variable and reference signals and independent of any fluctuation in the voltage output of said voltage source.

4,024,446

MOTOR CONTROL

James E. Burnett, Derry, N.H., assignor to Automation Industries, Inc., Los Angeles, Calif.

Filed Apr. 1, 1975, Ser. No. 564,148
Int. Cl.² H02K *29/00*
U.S. Cl. 318—685 **18 Claims**



1. Apparatus for moving an electrical motor's rotary member, the apparatus comprising

a plurality of optical channels each comprising a source of light and a light detector capable of producing an output voltage which varies in a predetermined way with changes in light flux striking the detector;

a movable light mask having an axis of rotation, linked to said rotary member for rotation therewith, and disposed for rotation intermediate the source and detector of each said optical channel, said mask comprising a plurality of alternating transparent and opaque regions disposed symmetrically about said axis of rotation; and

control means connected to receive the output voltages of said detectors and to cause operation of said electrical

motor for rotation of said rotary member until a first predetermined set of detector outputs occurs, and after a predetermined time lapse to cause operation of said electrical motor for rotation of said rotary member until a second predetermined set of detector outputs results, and continuously to cause a series of such alternating rotations and time lapses;

said optical channels being paired, the detectors of each pair of channels being angularly spaced apart with respect to said light mask axis by a predetermined angle such that at all times when the output voltage of each detector of said pair of optical channels is changing the output voltage of one will be increasing and the output voltage of the other will be decreasing,

said transparent and opaque regions being equiangular and said predetermined angle of detector separation being approximately

$$\theta = S(2n + 1)$$

where S = the angle subtended at said light mask axis by each said region and $n = 0, 1, 2, 3, \ldots,$

each said predetermined set of detector outputs including equal outputs from the detectors of two paired optical channels, and

said control means including means to subtract the smaller detector output voltage from the larger detector output voltage of two paired optical channels and to cause the resulting difference voltage to operate said electrical motor.

4,024,447

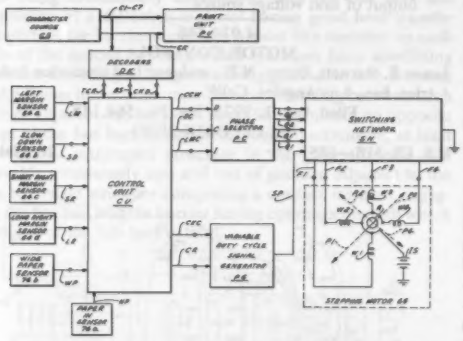
STEPPING MOTOR DRIVING APPARATUS

Maurice J. Epstein, Ardsley, N.Y., assignor to Computer Transceiver Systems, Inc., Paramus, N.J.

Filed June 25, 1975, Ser. No. 590,089

Int. Cl.² H02K *37/00*

U.S. Cl. 318—696 **14 Claims**



1. Apparatus for energizing a stepping motor having a plurality of phase windings wherein one end of each winging is connected to a common terminal and the other end of each winding is connected to a different distinct terminal, said apparatus comprising: a source of electric current having a first terminal connected to said common terminal and having a second terminal; a plurality of controllably operable current switching means, each of said current switching means being connected between a different one of said distinct terminals and the second terminal of said source of electric current; a switching network having a plurality of inputs and outputs, each of said outputs being connected to the control input of a different one of said controllably operable switching means; phase selector means having a plurality of outputs connected to different inputs of said switching network for selecting which of said controllably operable switching means are to be energized at any given time; and a selectively variable duty cycle signal generator having an output connected to an input of said switching network for controlling the duty cycle of the energization of the controllably operable switching means to be energized at a first duty cycle when the stepping motor is to be at rest and at a greater duty cycle when the stepping motor is to be stepped.

4,024,448

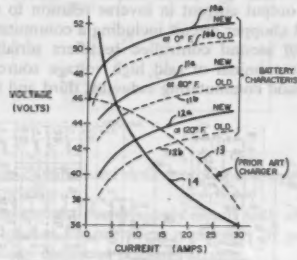
ELECTRIC VEHICLE BATTERY CHARGER

Clinton C. Christianson, Minnetonka, and Gene J. Seider, Bloomington, both of Minn., assignors to Gould Inc., Rolling Meadows, Ill.

Continuation of Ser. No. 176,559, Aug. 31, 1971, abandoned. This application Dec. 29, 1975, Ser. No. 645,265

Int. Cl.² H02J *7/00*

U.S. Cl. 320—23 **9 Claims**



1. A charging circuit for a storage battery, comprising in combination: an AC source of charging energy; rectification means coupled to a battery under charge for supplying pulsating DC charging energy to said battery; and a transformer for coupling said AC energy source to said rectification means, said transformer having leakage reactance such that the transformer in combination with the rectification means and the battery produces a large charging current during the initial charging period and a finishing charging current decreasing non-linearly at a continuously decreasing rate as a function of increasing battery charging voltage so that a finishing charging current of about 5% (in amperes) of the capacity of the battery under charge is supplied to the battery regardless of the age or temperature of the battery.

4,024,449

INTRINSICALLY SAFE POWER SOURCE WITH PLURAL CONVERSIONS

Peter H. Burrie, Haren; Harmen H. Dijstelbergen, Marum, and Cornelis W. Koreman, Roden, all of Netherlands, assignors to N.V. Nederlandse Gasunie, Groningen, Netherlands

Filed Mar. 27, 1975, Ser. No. 562,686

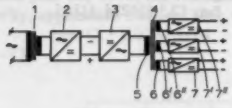
Claims priority, application Netherlands, Apr. 3, 1974, 7404518

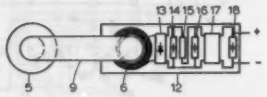
Int. Cl.² H02M *5/42*

U.S. Cl. 321—2 **5 Claims**

1. An intrinsically safe power source comprising a converter circuit in which a 50 or 60 cps AC voltage is converted into a DC voltage, wherein the DC voltage is in turn converted into a AC voltage having a higher frequency than the initiating voltage, and wherein the higher frequency AC voltage is in turn converted into at least one source of DC voltage, said converter circuit including a transformer, said transformer comprising a divisible core having first and second portions located opposite one another, a primary winding positioned on said first portion, at least one printed circuit board having a coil fixedly attached thereto positioned on said second portion so that said coil forms a secondary winding of said transformer, said converter circuit further including circuit means connected to said coil and fixedly attached to said printed circuit board for rectifying, smoothing and stabilizing the power output of the power source wherein the output voltage is smaller than a value of the output voltage which multiplied

by 1.5 would equal the minimum ignition voltage, the inductance of the power source is smaller than 10 milli-Henry and





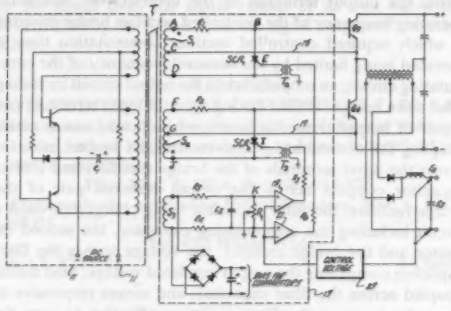
the resistance of the power source limits the output voltage and current to values smaller than ⅜ of any combination of minimum ignition voltage and current values.

4,024,450

POWER TRANSISTOR SWITCHING CIRCUIT

Carlos Ernesto Buonavita, South Pasadena, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Aug. 18, 1975, Ser. No. 605,434
Int. Cl.² H02P 13/18
U.S. Cl. 321—2 2 Claims



1. A regulated voltage power supply having transistor switching circuitry which develops a regulated D.C. output voltage from the switching and rectification of an unregulated D.C. voltage, said switching circuitry comprising:

a. a first and second power switching transistor, each having a base, emitter and collector electrodes;

a1. a square wave generator which is energized by said unregulated D.C. voltage source;

a2. transformer means having a primary winding energized by the output of said square wave generator, and having a first, second, and third secondary winding, said first and second secondary winding so arranged as to have a portion thereof connected across the base and emitter of said first and second switching transistors, thus to form a first and second floating circuit which is isolated D.C.-wise from other circuits of the regulated power supply;

b. first and second SCR switching means, connected across said first and second secondary windings of said transformer means, said first and second SCR switching means so connected as to provide, when triggered, a negative cut-off bias across each of the base-emitter junctions of each of the said power switching transistors;

b1. a triangular ramp voltage generating circuit energized by said third secondary winding and functioning to form a first and second train of triangular sawtooth pulses which are 180° out of phase;

b2. a control voltage source to provide a voltage level representative of the amount of departure of the regulated D.C. output voltage from its desired value;

b3. first and second comparator means for comparing the value of the output of said control voltage source with the voltage of said first and second train of triangular sawtooth voltages;

b4. means to provide a first and second trigger pulse when the output voltage of said control source exceeds the instantaneous value of the voltage on said first and second pulse trains of said triangular sawtooth voltage;

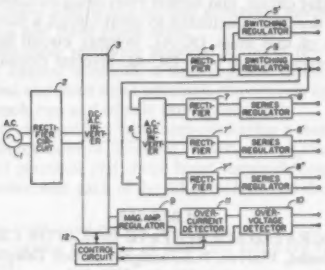
b5. first and second pulse trigger transformers connected from said first and second comparator means to said first and second switching means in said first and second floating circuits.

4,024,451

STABILIZED DC POWER SUPPLY DEVICE

Hisao Nishino, and Kouichirou Ohta, both of Yokohama, Japan, assignors to Tohoku Metal Industries Limited, Japan

Filed Jan. 14, 1976, Ser. No. 648,908
Claims priority, application Japan, June 28, 1975, 50-79733
Int. Cl.² H02H 7/12
U.S. Cl. 321—2 12 Claims



1. A stabilized DC power supply device for providing a plurality of different DC powers with regulated voltage levels and with different rated currents, comprising:

a DC power source,

a main DC-AC inverter circuit coupled to said DC power source and providing high frequency AC outputs from said DC power source, said main inverter circuit comprising transistor circuit means an inverter transformer coupled to said transistor circuit means, said transformer having first, second and third secondary windings, from each of which a high frequency AC output is taken out,

a rectifier circuit coupled to said first secondary windings of said inverter transformer for rectifying the AC output presented on said first secondary windings of said inverter transformer to provide a DC output,

a transistor switching regulator circuit coupled to the DC output from said rectifier circuit and providing a predetermined first DC power with a regulated voltage level at a DC output thereof,

a DC-DC converter circuit coupled with said DC output of said transistor switching regulator circuit,

a transistor series regulator circuit coupled to an output of said DC-DC converter and having an output providing a predetermined second DC power with a regulated voltage level and with a lower rated current than said first DC power,

a magnetic amplifier regulator circuit coupled to said sec-

ond and third secondary windings of said inverter in said main DC-AC inverter circuit, said magnetic amplifier regulator circuit having an output providing a predetermined third DC power with a regulated voltage level and with a higher rated current than said first DC power,

means coupled to said magnetic amplifier regulator circuit for detecting overvoltage of the output from said magnetic amplifier regulator circuit and having an output indicating an overvoltage condition, said overvoltage detecting means including a zener diode coupled to said magnetic amplifier regulator circuit and which conducts when the output voltage of said magnetic amplifier regulator circuit exceeds a predetermined voltage level, a transistor coupled to said zener diode so as to conduct when said zener diode is conducting, and a relay coupled to said transistor and which is switched on when said transistor is conducting.

means coupled to said magnetic amplifier regulator circuit for detecting overcurrent of the output from said magnetic amplifier regulator circuit and having an output indicating an overcurrent condition, said overcurrent detecting means including an overcurrent relay coupled to said magnetic amplifier regulator circuit and which is switched on when the output current of said magnetic amplifier regulator circuit exceeds a predetermined current level, and

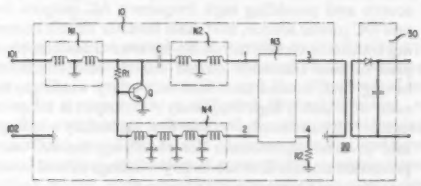
control means including a thyristor coupled to said main DC-AC inverter circuit and to said relays of both said overvoltage detecting means and said overcurrent detecting means, said thyristor being actuated responsive to at least one of said relays being switched on, and a further relay coupled to said thyristor and to said main DC-AC inverter circuit, said further relay being switched on when said thyristor is actuated to short-circuit a partial circuit path of said main DC-AC inverter circuit to stop the operation of said main DC-AC inverter circuit.

4,024,452

INTEGRATED SOLID STATE ISOLATOR CIRCUIT

Harold Seidel, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 10, 1976, Ser. No. 665,420
Int. Cl.² H02M *3/28*
U.S. Cl. 321—2 **5 Claims**



1. An integrated circuit for developing an output signal in response to, but isolated from, an input signal comprising:

an oscillator activated by said input signal for generating microwave signals;

a planar transformer having a primary and a secondary winding, with said primary winding being responsive to said microwave signals; and

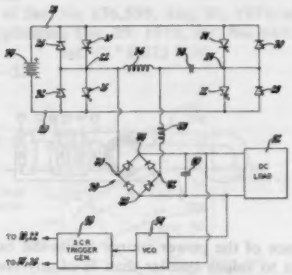
means connected to said secondary winding for rectifying the signal of said secondary winding to develop said output signal.

4,024,453

INVERTER FOR SUPPLYING A REGULATED VOLTAGE

Thomas M. Corry, Goleta, Calif., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 26, 1976, Ser. No. 718,023
Int. Cl.² H02M *3/315*
U.S. Cl. 321—2 **2 Claims**



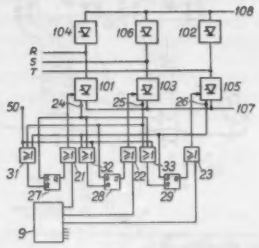
1. An inverter circuit for supplying a regulated DC voltage and characterized by its reliable operation for all load conditions including a short circuit load condition, comprising: a controlled rectifier bridge inverter having a pair of input terminals and a pair of output terminals; a DC voltage source coupled across the input terminals of the inverter; a commutating circuit, the commutating circuit including a commutating capacitor and a commutating inductor series coupled across the output terminals of the inverter, the maximum operating frequency of the controlled rectifier bridge inverter at which required controlled rectifier commutation time is provided being limited by the resonant frequency of the commutating circuit; an output circuit, the output circuit including a full wave bridge rectifier having a pair of input terminals and a pair of output terminals, a second inductor, means series coupling the commutating inductor and the second inductor across the input terminals of the bridge rectifier, and a filter capacitor coupled across the output terminal pair of the bridge rectifier, the filter capacitor being charged through a circuit including the commutating capacitor, the second inductor and the bridge rectifier, the voltage across the filter capacitor comprising the output regulated voltage; load means coupled across the filter capacitor; and means responsive to the voltage across the filter capacitor effective to vary the frequency of operation of the controlled rectifier bridge inverter in a sense to maintain a constant voltage value across the filter capacitor, the last-mentioned means having a predetermined maximum frequency of operation occurring when the load means is short circuited and the filter capacitor is discharged, the commutating capacitor and the commutating inductor defining a commutating circuit resonant frequency that is less than the predetermined maximum frequency when the voltage across the filter capacitor is at the constant voltage value and the commutating capacitor and the parallel combination of the commutating inductor and the second inductor defining a commutating circuit resonant frequency that is greater than the predetermined maximum frequency when the load means is short circuited and the filter capacitor is discharged, the resonant frequency of the commutating circuit being increased to above the predetermined maximum frequency during the period that the load means is short circuited to thereby provide reliable operation of the controlled rectifier bridge inverter for all load conditions including a short circuited load condition.

4,024,454

HOLDING CIRCUIT FOR STATIC CONVERTOR VALVES

Ake Ekstrom, and Lars-Erik Juhlin, both of Ludvika, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Jan. 26, 1976, Ser. No. 652,525
Claims priority, application Sweden, Mar. 6, 1975, 7502478
Int. Cl.² H02M 1/18
U.S. Cl. 321—12 6 Claims



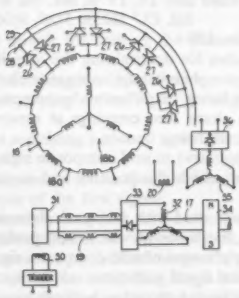
1. In a static convertor which comprises at least one rectifier bridge with valves or rectifiers (101–106) arranged in commutating groups (101,103, 105 and 102,104,106, respectively), a common control pulse emitter (9) for the valves, individual control circuits (6–8) connecting the common control pulse emitter to the valves, means to ensure that during operation one valve in each commutating group always receives an ignition signal, said means for each valve comprising a holding circuit (27–29, 21–23) for the control circuit of the valve and one signal output (24–26) for indicating valve ignition, which holding circuit is connected on its input side (27–29) to said signal outputs (24–26) for the valves in the proper commutating group in such a way that the holding circuit is switched on by the signal from the signal output of its own valve and switched off by the signals from the signal outputs of the other valves.

4,024,455

ROTARY INVERTERS FOR CONVERTING D.C. TO A.C.

Christopher John Yarrow, Bradford, and Ronald Johnson, Leeds, both of England, assignors to Lucas Industries Limited, Great Britain

Filed Mar. 4, 1976, Ser. No. 663,935
Claims priority, application United Kingdom, Mar. 6, 1975, 9287/75
Int. Cl.² H02M 7/54
U.S. Cl. 321—29 4 Claims



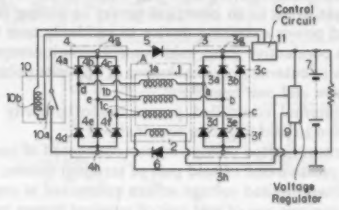
1. A rotary inverter comprising the combination of a rotary field winding, a stationary armature winding including two separate winding portions which are electrically isolated from one another but magnetically coupled together, switching means for controlling the connection of a d.c. supply to tappings on one armature winding portion in synchronism with the rotation of the field winding, and a.c. output terminals connected to the other armature winding portion.

4,024,456

GENERATOR SYSTEM WITH SPEED RESPONSIVE OUTPUT WINDING SWITCHING DEVICE

Suguru Sato, Obu, and Kazumasa Mori, Aichi, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed May 20, 1976, Ser. No. 688,389
Claims priority, application Japan, May 29, 1975, 50-64537
Int. Cl.² H02P 9/00
U.S. Cl. 322—29 5 Claims



1. A current generating system for a motor vehicle comprising;

a three-phase alternating current generator having a field winding and three phase coils;

a first full-wave rectifying network having a first positive direct current terminal, a first negative direct current terminal and three input terminals respectively connected with each one end of said three phase coils;

a second full-wave rectifying network having a second positive direct current terminal, a second negative direct current terminal and three input terminals respectively connected with each of the other ends of said three phase coils;

a battery connected across said first positive and negative direct current terminal of said first full-wave rectifying network;

a voltage regulator including a field control device and voltage responsive means coupled to said field control device and connected across said battery;

a first diode connected at its cathode with said first positive direct current terminal and at its anode with said second positive direct current terminal;

a second diode connected at its anode with said first negative direct current terminal and at its cathode with said second negative direct current terminal;

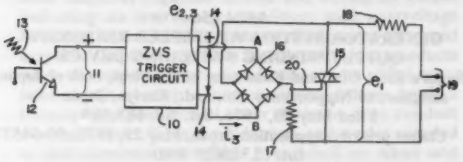
a switching device having normally closed contacts connected between said second positive and negative direct current terminal and an energizing coil disposed adjacent said contacts; and

a control circuit including a current coil connected between said first positive direct current terminal and the positive terminal of said battery for producing electromotive force in response to the amount of current flowing therethrough, a reed switch disposed adjacent said current coil and having normally opened contacts actuated to close when the electromotive force at said current coil exceeds a predetermined value, and a switching transistor having a base operatively connected to said battery through said reed switch, the collector-emitter path of said switching transistor being connected to said battery through said energizing coil, whereby said energizing coil is actuated to open said normally closed contacts of said switching device when said switching transistor becomes conductive.

4,024,457
HARD-FIRING ZERO-CROSSING TRIGGER CONTROL CIRCUIT

Grant C. Riddle, 29 Harvard, Sunnyvale, Calif. 94087

Filed Nov. 4, 1975, Ser. No. 628,775
Int. Cl.² G05F 5/00; H03K 17/60
U.S. Cl. 323—35 25 Claims



1. A control circuit for effecting an instantaneous voltage and current drive to an electrical power switching device to cause said power switching device to suddenly turn ON and latch in a conductive state, said control circuit comprising:

a. a pair of external terminal busses of opposite polarity, one positive and one negative;

b. an internal controlled power bus of polarity positive relative to said negative terminal bus;

c. a current-limited voltage source connected at one end to said positive one of said pair of terminal busses;

d. a voltage-limited voltage source connected at one end to said positive one of said pair of terminal busses and at the other end connected to said internal controlled power bus;

e. a low-voltage switching control circuit connected between said internal controlled power bus and the negative polarity bus of said pair of terminal busses;

f. a high voltage switching power driver including a high voltage current booster connected between said pair of terminal busses;

g. means operatively associated with said low voltage switching control circuit operable to cause said low voltage switching control circuit to function as an input control sensor and to produce a sudden high speed transient drive to said high voltage power driver;

h. a high voltage regenerative feedback power switching circuit connected between said pair of terminal busses;

i. means operable to provide functional stability to said low voltage switching control circuit and said regenerative feedback power switching circuit, and including means for clamping said terminal bus voltages at predetermined values and for shunting unwanted thermal leakage currents to non-sensitive portions of the circuit;

j. means operable to convert said regenerative feedback power switch to a high-voltage latching current-limited switch to produce sudden current pulses; and

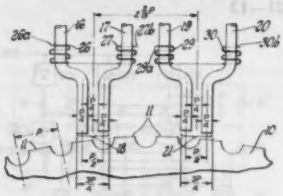
k. a degenerative feedback circuit connected between said regenerative feedback power switching circuit and one of said terminal busses and operable to counter the regenerative effect and limit the maximum amplitude of said current pulses to a predetermined value.

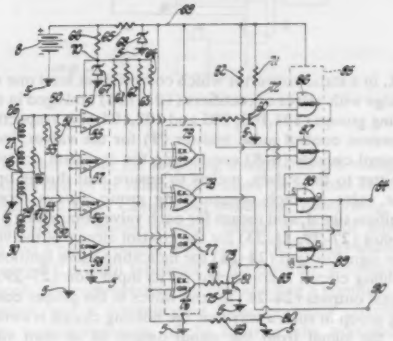
4,024,458
ELECTRICAL SIGNAL GENERATING SYSTEM

Jackson R. Templin, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed June 15, 1976, Ser. No. 696,411
Int. Cl.² H03B 3/04; F02P 5/08; G01P 3/66
U.S. Cl. 328—133 10 Claims

1. An electrical signal generating system comprising: means for generating two alternating current wave forms phase displaced from each other by a selected number of electrical degrees and for changing the phase relationship thereof at predetermined intervals; means for producing a reference signal pulse at selected zero crossover points of each cycle of a selected one of said alternating current wave forms; means for inverting the other one of said alternating current wave forms; means responsive to said reference signal pulses and selected polarity half cycles of the said other one of said alternating current wave forms for producing system periodic output signal initiating signal pulses; means responsive to said reference signal pulses and selected polarity half cycles of the inverted said other one of said alternating current wave forms





for producing system periodic output signal terminating signal pulses; and an electrical signal responsive circuit means operable between first and second conditions of operation in response to said system periodic output signal initiating and terminating signal pulses for producing a system periodic output signal while in a selected one of said first and second conditions of operation.

4,024,459
AMPLITUDE MEASUREMENT OF SIGNALS OF DIFFERENT FREQUENCY

William E. Mears, Leawood, Kans., assignor to Wilcox Electric, Inc., Kansas City, Mo.

Filed Jan. 15, 1976, Ser. No. 649,464
Int. Cl.² H03K 5/20, 9/06
U.S. Cl. 328—139 9 Claims

1. Apparatus for determining the amplitude of one of the alternating components of a composite alternating signal, said components being of different frequencies and having substantially in-phase zero crossings at recurring intervals, said apparatus comprising:

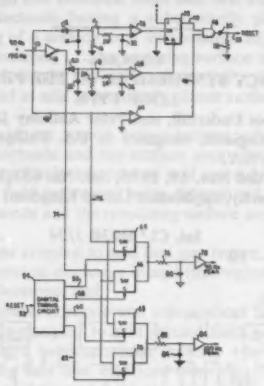
means responsive to said composite signal for detecting the times at which the positive and negative peaks thereof occur;

means connected with said peak detecting means, responsive to the times at which said peaks occur and to the polarity changes of said composite signal for producing a reference signal each time said composite signal changes polarity in one direction between successive positive and negative peaks, whereby each reference signal is produced at a time related to the zero crossing of said components in said one direction,

timing circuitry responsive to said reference signals for producing a timing signal having the same frequency as said one component and occurring in synchronism therewith; and

synchronous detector means connected with said timing

circuitry and responsive to said timing signal and said composite signal for delivering an output signal having a

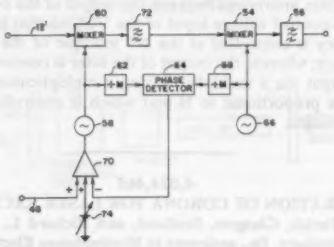


magnitude representing the amplitude of said one component.

4,024,460
ELECTRONIC LINE STRETCHER

Hugo Vifian, Santa Rosa, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 418,324, Nov. 23, 1973, abandoned. This application July 7, 1975, Ser. No. 593,610
Int. Cl.² H03K 5/20; H03B 3/06; H03K 9/06
U.S. Cl. 328—155 3 Claims



1. A phase shift circuit for shifting the phase of an input signal comprising;

input means for receiving the input signal;

first means for supplying a first signal having a first frequency;

second means for supplying a second signal having a second frequency;

first circuit means connected to the first means for supplying a submultiple of the first signal;

second circuit means connected to the second means for supplying a submultiple of the second signal;

control means connected to the first means and the first and second circuit means for comparing the relative phase of the submultiples of the first and second signals for making the frequencies of the submultiples of the first and second signals equal and controlling the relative phase thereof;

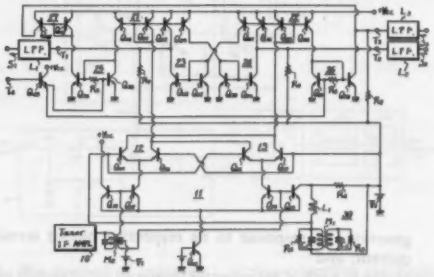
third circuit means connected to the input means and the first means for producing a third signal having a frequency equal to the second frequency plus or minus the frequency of the input signal; and

heterodyne converter means connected to the third circuit means and the second means for producing an output signal equal in frequency to the input signal and shifted in phase with respect to the input signal.

4,024,461
FM DISCRIMINATOR

Mitsuo Ohsawa, Fujisawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 23, 1976, Ser. No. 679,862
Claims priority, application Japan, Apr. 24, 1975, 50-50047; May 8, 1975, 50-55735
Int. Cl.² H03D 3/06
U.S. Cl. 329—138 10 Claims



1. An FM discriminator having circuit means providing at least two differential switching circuits supplied with a frequency modulated signal and an additional signal which has a predetermined phase difference with respect to said frequency modulated signal, said circuit means producing first and second output signals in opposite phase relationship with each other in response to the phase difference between said frequency modulated and additional signals, and including:

a. a first constant current signal course for producing a first constant current alternating signal which is varied in its duty ratio in response to the frequency of said first and second output signals;

b. a second constant current signal source for producing a second constant current alternating signal which is opposite in polarity with respect to said first constant current alternating signal; and

c. biasing means for applying a biasing voltage to said first and second constant current signal sources through resistor means, to maintain a predetermined DC level on said first and second constant current alternating signals.

4,024,462
DARLINGTON CONFIGURATION HIGH FREQUENCY DIFFERENTIAL AMPLIFIER WITH ZERO OFFSET CURRENT

Jerry Lee Highnote, and Richard Lewis O'Day, both of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 27, 1975, Ser. No. 580,980
Int. Cl.² H03F 3/45
U.S. Cl. 330—25 25 Claims

25. A method for driving with a substantially zero d.c. off-set current a load connected in the output path of a symmetric differential amplifier of the type comprising a pair of amplifiers, each amplifier having a pair of output terminals and a control terminal, said method comprising the steps of:

providing each amplifier of said pair of amplifiers with a sufficiently high gain that the currents from its respective output terminals are substantially equal in magnitude;

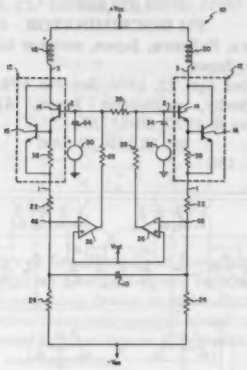
capacitively coupling together currents from an output terminal of each amplifier;

generating a pair of precision voltages proportional to the current flowing from each of said output terminals;

comparing said precision voltages to a reference voltage to

generate a pair of bias signals corresponding to substantially zero d.c. off-set current in said load;

applying to each of said control terminals the bias signal



generated in response to its respective output terminal current; and

applying to each of said control terminals input signals to be differentially amplified and used for driving said load.

4,024,463

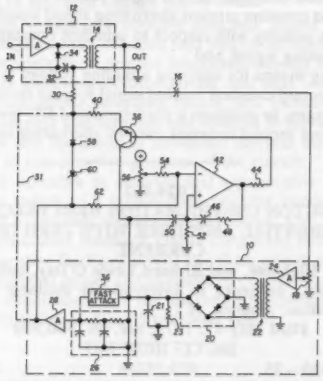
A.C. AMPLIFIER AUTOMATIC GAIN CONTROL FAST ATTACK CIRCUIT

Arlo D. Pelley, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 3, 1976, Ser. No. 682,288

Int. Cl.² H03G *3/20*

U.S. Cl. 330—138 **8 Claims**



1. In combination with an A.C. amplifier circuit and an automatic gain control circuit having detector means for developing a D.C. signal proportional to the output amplitude of the amplifier circuit for controlling its output amplitude when the input signal thereto exceeds a predetermined AGC threshold level, a fast-attack circuit, comprising:

means for detecting a rise in the level of the D.C. signal and providing an output signal whose magnitude is proportional thereto;

control signal means for providing an enable signal whose duration is no greater than the stabilization period for the automatic gain control circuit in response to said output signal when its magnitude exceeds a predetermined threshold level, and

switching means for applying the D.C. signal directly to the A.C. amplifier in response to the presence of said enable signal.

4,024,464

FREQUENCY SYNTHESIZER OF THE PHASE LOCK LOOP TYPE

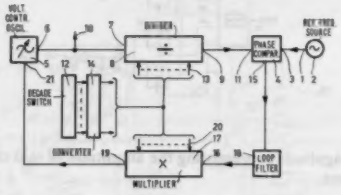
Michael James Underhill, and Peter Anthony Jordan, both of Crawley, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,217

Claims priority, application United Kingdom, Dec. 12, 1974, 53792/74

Int. Cl.² H03B *3/04*

U.S. Cl. 331—10 **5 Claims**



1. A frequency synthesiser of the phase lock loop type including a reference frequency source, a voltage-controlled oscillator (VCO) the output frequency of which forms the synthesiser output, a frequency divider connected to the VCO output, which divider is arranged to divide the said output frequency by a selectively-variable integer N, control means for setting the value of N in said divider, a phase comparator having a first input connected to the output of the divider and a second input connected to the reference frequency source, a loop filter interposed between the output of the comparator and the control voltage input of the VCO so that said output frequency is controlled at the N^{th} multiple of the reference frequency; wherein the output of the filter is connected to the VCO input via a multiplier having a multiplication factor *n* which is proportional to N and which is controlled by said conrol means.

4,024,465

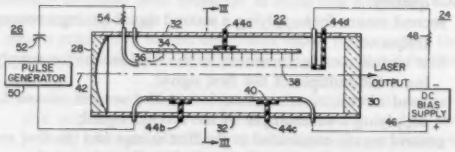
GENERATION OF CORONA FOR LASER EXCITATION

Owen Farish, Glasgow, Scotland, and Richard L. Hundstad, Wilkinsburg, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 365,392, May 30, 1973, abandoned. This application July 1, 1975, Ser. No. 592,291

Int. Cl.² H01S *3/02*

U.S. Cl. 331—94.5 G **2 Claims**



1. A high-pressure gas laser apparatus for use in producing a laser output comprising:

a resonant optical cavity including optical reflective elements passively terminating each end of said cavity,

a gas medium at high pressure suitable for lasing action,

an envelope volume substantially enclosing the resonant optical cavity,

an electrode assembly positioned within said envelope hav-

ing a first field gap region and a second field gap region, wherein said electrode assembly includes first, second and third electrodes,

said second electrode being at least one corona pin protruding through and insulated from said first electrode,

said first electrode having a substantially planar surface consisting of a surface area immediately adjacent to said second electrode and a remaining surface area,

said third electrode having a substantially planar surface and parallel to said substantially planar surface or the first electrode,

said first field gap region being determined between the second electrode and the surface area of said first electrode immediately adjacent to said second electrode,

said second field gap region being determined between said third electrode and the remaining surface area of said first electrode,

pulsing means coupled to said first gap region for establishing an electrical discharge in said first region for generating free electrons, and

D.C. bias means, separate and independent from said pulsing means, coupled to said second field gap region for establishing a predetermined uniform electric field for accelerating said free electrons from said first field gap region to said second field gap region for excitation of said gas medium to lasing vibrational energy levels by electron collision.

4,024,466

LASER CONTAINING A LASER RESONATOR

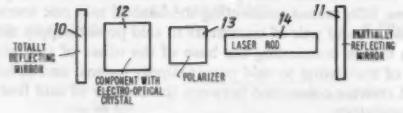
Gregor Cremosnik, Regensdorf, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Aug. 18, 1975, Ser. No. 605,645

Claims priority, application Switzerland, Aug. 28, 1974, 11718/74

Int. Cl.² H01S *3/08*

U.S. Cl. 331—94.5 D **4 Claims**



1. A laser arrangement containing a laser resonator comprising:

a. two mirrors;

b. a laser rod; and

c. an electro-optical modulation device between said two mirrors;

d. said modulation device comprising:

i. a polarization element and

ii. a component possessing an electro-optical crystal between one of said two mirrors and said polarization element;

e. said electro-optical crystal having oppositely situated partially reflecting surfaces at which there are arranged electrodes; said polarization element possessing oppositely situated partially reflecting surfaces

f. both of the oppositely situated partially reflecting surfaces of the electro-optical crystal and of the polarization element possessing:

i. a degree of planeness less than one-tenth of the wavelength of the laser light and

ii. a plane parallelism of less than five arc seconds with respect to each other and to the resonator mirrors for increasing the stored energy in the laser resonator and the power output.

4,024,467

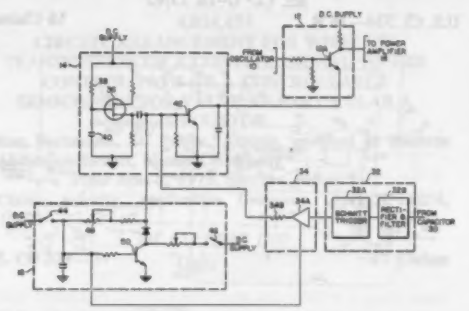
METHOD FOR CONTROLLING POWER DURING ELECTROSURGERY

Stephen William Andrews, and Stanley Woltosz, both of Rochester, N.Y., assignors to Sybron Corporation, Rochester, N.Y.

Division of Ser. No. 488,281, July 15, 1974, Pat. No. 3,923,063. This application June 2, 1975, Ser. No. 582,593

Int. Cl.² A61N *3/02*; H03K *7/08*

U.S. Cl. 332—14 **1 Claim**



1. The method of controlling, during operating conditions, the average power of a pulse modulated output signal on an electrosurgical unit which comprises the following steps:

selecting the mode of operation;

providing a pulse modulated output signal having a constant amplitude; and

varying the duty cycle of said output signal to obtain the amount of power desired for the particular operating conditions while allowing the amplitude to remain substantially constant.

4,024,468

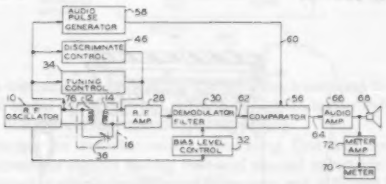
INDUCTION BALANCE METAL DETECTOR WITH INVERSE DISCRIMINATION

Richard Edward Hirschi, Sweet Home, Oreg., assignor to White's Electronics, Inc., Sweet Home, Oreg.

Filed June 18, 1975, Ser. No. 587,844

Int. Cl.² G01V *3/10*

U.S. Cl. 324—3 **15 Claims**



1. An induction balance metal detector apparatus in which the improvement comprises:

search head means including transmit coil means for producing an electromagnetic field in response to an electrical input signal, and receive coil means for producing received signals at the output of the receive coil means in response to the presence of metal objects in said field;

discriminator means for applying one portion of said input signal to the receive coil as a first component of the received signal without cancellation of the received signal, to set the quiescent operating point of the metal detector and to change the phase of the received signal to amplitude discriminate between received signals produced by different types of metal objects which have phase angles between about −90° and −180° with respect to the received signal produced by magnetic mineral soil and for producing a detector output signal corresponding to certain predetermined types of said metal objects; and

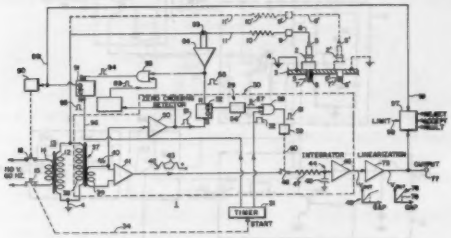
indicator means for indicating when said detector output signal is produced.

4,024,469

APPARATUS FOR MEASURING SPARK PLUG GAP SPACING

Henry Alan Bobulski, Westerville, Ohio, assignor to Production Measurements Corporation, Natick, Mass.

Filed Mar. 24, 1975, Ser. No. 561,424
Int. Cl.² G01R *13/42*
U.S. Cl. 324—16 R **16 Claims**



1. Apparatus for measuring a spark plug gap spacing, comprising a source of AC high voltage.

means for applying said high voltage across a spark plug,

means for measuring the time between zero crossing of said high voltage and the firing of the spark plug, and for averaging said time for several firings during half-cycles of said high voltage for the same spark plug,

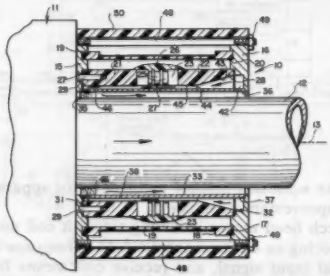
means for indicating said averaged, measured time as a function of the spark plug gap spacing.

4,024,470

EDDY CURRENT DETECTOR FOR HOT TEST PIECES HAVING COOLANT FLUID AND PURGE FEATURES

Joseph P. Vild, Lyndhurst; William I. Cleary, Youngstown, and Donald P. Fox, Cleveland, all of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Filed May 20, 1974, Ser. No. 471,183
Int. Cl.² G01R *33/12*
U.S. Cl. 324—37 **7 Claims**



1. An eddy current detector for inspecting hot steel pipe or the like passing along a workpiece path of travel comprising:

a. a pair of spaced annular end plates;

b. a circumferentially endless, tubular, metallic, nonmagnetic heat shield surrounding the workpiece path and carried by the end plates;

c. a detector assembly carried by the end plates in circumferentially spaced relationship to at least a portion of the heat shield thereby defining a flow passage therebetween;

d. an exciter connected to the detector assembly and positioned sufficiently close to the path to induce eddy currents in a workpiece; and,

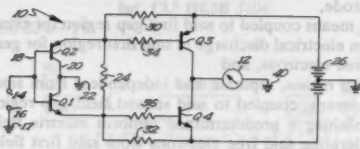
e. said detector including inlet and outlet passages for conducting fluid into and out of the flow passage, said outlet passages being directed toward the workpiece path.

4,024,471

METER AND AMPLIFIER CIRCUIT FOR MEASURING AC AND DC SIGNALS

Ronald J. Bakken, 3918 - 31st Ave. South, Minneapolis, Minn. 55406

Filed Sept. 8, 1975, Ser. No. 611,061
Int. Cl.² G01R *1/30, 19/22*
U.S. Cl. 324—123 R **7 Claims**



1. A meter and amplifier circuit comprising a pair of input terminals, a first pair of opposite conductivity transistors, a second pair of opposite conductivity transistors, the transistors of each pair having a base, collector and emitter, the bases of said first pair of transistors being connected together and to one of said input terminals, power supply means, a meter, first means connecting said power supply means and meter in circuit with the collector and emitter of one of said second pair of transistors, second means connecting said power supply means and meter in circuit with the collector and emitter of the other of said second pair of transistors, third means connecting the collector and emitter of one of said first pair of transistors in circuit with said power means including a first resistor connected between the emitter of said one of said first pair of transistors and said power supply means, fourth means connecting the collector and emitter of the other of said first pair of transistors in circuit with said power means including a second resistor connected between the emitter of said other of said first pair of transistors and said power means, fifth means connecting the base of said one transistor of said second pair of transistors to said power supply means, sixth means connecting the base of the other of said second pair of transistors to said power supply means, and at least a third resistor connected between the emitter of said first pair of transistors.

4,024,472

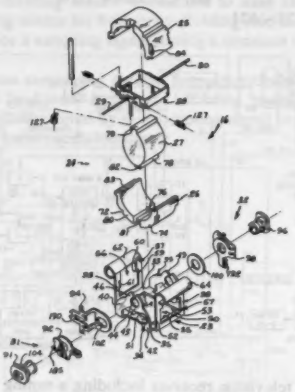
METER CONSTRUCTION

Julius Nador, Plainfield, and David B. Pearson, Raritan, both of N.J., assignors to Weston Instruments, Inc., Newark, N.J.

Filed Aug. 2, 1974, Ser. No. 494,320
Int. Cl.² G01R *1/16, 1/00*
U.S. Cl. 324—151 R **24 Claims**

21. An indicating instrument comprising, a support having sides and ends integral with and projecting in the same direction from base portion means, said base portion means supporting said sides for flexing movement with respect to the base portion without moving said ends; a magnetic circuit including a yoke and a magnet; cooperating locating and securing means on said magnetic circuit and base for positioning and securing said magnetic circuit on the base by flexing said sides; a moving coil assembly; taut band suspenssion means mounting said coil assembly on said ends of said support for rotation about a predetermined axis with respect to the support; a pointer support; cooperating fixed surface means on said pointer support and coil assembly for accurately locating the pointer support with respect to one end of the coil assembly; means integral with one of the coil assembly

and pointer support for clamping the pointer support to the coil assembly to secure the pointer support to the coil assembly; a terminal at a second end of the coil assembly; cooperating fixed surface means for locating a terminal assembly with respect to the coil; and stop means on said pointer support and



said terminal assembly presenting surfaces cooperating with surfaces carried by said ends of said support to limit transverse movement of the coil assembly caused by shock and vibration, so that damage to the taut band suspension of the instrument is minimized.

4,024,473

STROBOSCOPIC DEVICE

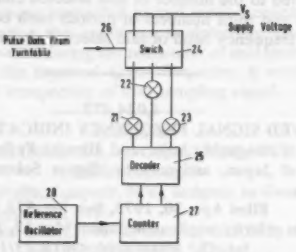
Gordon Malcom Edge, Saffron Walden; Keith Douglas Ridler, Fulbourn, and Frederick James Easthope, Cambridge, all of **England, assignors to Strathearn Audio Limited, Belfast, Northern Ireland**

Filed June 30, 1975, Ser. No. 591,401

Claims priority, application United Kingdom, July 1, 1974, 29122/74

Int. Cl.² G01P *3/48*

U.S. Cl. 324—168 **5 Claims**



1. An arrangement for use in providing an indication related to the speed of rotation of a body, said arrangement including a plurality of switch operating devices, said switch operating devices being arranged to be rotated at a speed related to the speed of rotation of the body, switch means operated responsive to said devices during their rotation, signal generator means having an output at a frequency related to a desired speed of rotation of the body, indicator means comprising three or more visual display devices, means for providing signals to said visual display devices, said signals relating to both the operation of the switch means and the output from the signal generator means, and means for causing the display devices to be operated according to the phase relationship between the operation of the switch means and the output from the generator means in such a way that the degree of apparent motion of the indicator means in one direction indicates the amount by which the speed of rotation of the body varies in one sense from that of the desired speed, while the degree of apparent motion of the indicator means in another direction indicates the amount by which the speed of rotation of the body varies in the other sense from that of the desired speed.

4,024,474

CIRCUIT ARRANGEMENT FOR WIRELESS TRANSMISSION OF A CONTROL SIGNAL TO THE CONTROL PATH OR A CONTROLLABLE SEMICONDUCTOR VALVE, IN PARTICULAR A THYRISTOR

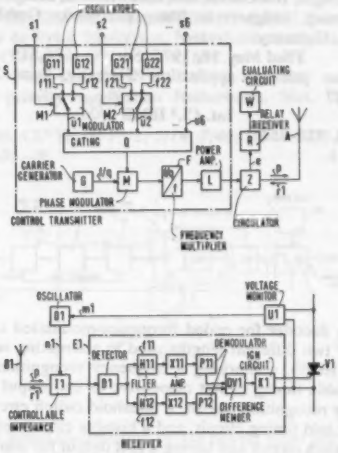
Oskar Beckmann, St. Polten, Austria, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 7, 1975, Ser. No. 565,679

Claims priority, application Germany, Apr. 8, 1974, 2416923

Int. Cl.² H04B *1/00*

U.S. Cl. 325—37 **7 Claims**



1. A circuit arrangement for the wireless transmission of a control signal to the control path of a semiconductor valve in a high voltage current converter comprising:

a. means for simultaneously generating first and second subcarrier signals having first and second subcarrier frequencies which are different from zero and different from each other and which are constant;

b. means for generating a high frequency carrier signal;

c. a first modulator responsive to the control signal and said first and second subcarrier signals for generating a frequency shift output signal, said output signal comprising only said first constant frequency signal when said control signal is in a condition associated with the ignition state of said valve and said second constant frequency signal when said control signal is in a condition associated with the extinguished state of said valve;

d. a second modulator responsive to said high frequency carrier and said frequency shift output signal for developing a high frequency output signal;

e. means for wirelessly transmitting said high frequency output signal; and

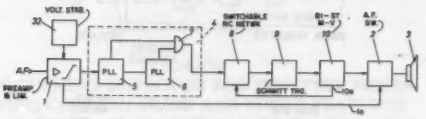
f. means for receiving said high frequency output signal comprising:

1. a detector responsive to said high frequency output signal for demodulating said signal;
2. a first circuit branch including a filter tuned to said first subcarrier frequency and an amplitude demodulator connected to the output of said filter for developing an output signal for igniting said valve;
3. a second circuit branch including a filter tuned to said second subcarrier frequency and an amplitude demodulator connected to the output of said filter for developing an output signal for blocking the ignition of said valve;
4. a difference circuit responsive to the output signals from said first and second branches; and
5. an ignition circuit whose input is connected to the output of said difference circuit and whose output is connected to said control path.

4,024,475
DECODER FOR FREQUENCY-MODULATED TONES OF TWO DIFFERENT LENGTHS

Peter Brägas, Hildesheim, and Uwe Mätzold, Salzgitter, both of Germany, assignors to Blaupunkt-Werke GmbH, Hildesheim, Germany

Filed May 14, 1976, Ser. No. 686,519
Claims priority, application Germany, June 23, 1975, 2527857
Int. Cl.² H04B *1/06*
U.S. Cl. 325—55 **6 Claims**



1. A decoder for coded frequency-modulated control signals of two different lengths used in alternating sequence of signal length, comprising a frequency recognition circuit, a switchable timing circuit responsive to the output of the frequency recognition circuit, a threshold switch circuit responsive to said timing circuit, and a bistable circuit responsive to said switch circuit and having a first output for controlling the switchable timing of said timing circuit and a second output for operating a control function for the operation of which said control signals are useful, and further comprising the improvement wherein:

said frequency recognition circuit (4) comprises two phase locked loops (5,6) and an AND-gate (7), each of said phase locked loops having a voltage controlled oscillator and a phase comparator;

the voltage controlled oscillator of the first phase-locked loop (5) is tuned to the carrier frequency of said FM control signals and the voltage controlled oscillator of the second phase locked loop (6) is tuned to the frequency-modulation frequency of said FM control signals;

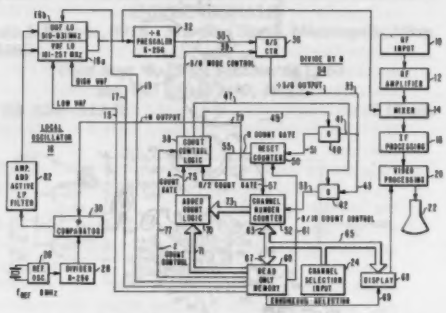
a connection is provided from a point in said first phase lock loop (5) following its phase comparator to an input of the phase comparator of the second phase locked loop (6) for supplying frequency modulation detected by said first phase locked loop to said second phase locked loop, and

each of said phase locked loops has outputs (19,31) from whch a signal showing a locking-in of the oscillator to an input frequency provided to the loop, each of said outputs being connected to an input of said AND-gate (7), of which the output is the output of the frequency recognition circuit to which said switchable timing circuit is responsive.

4,024,476
PROGRAMMABLE FREQUENCY DIVIDER FOR A TELEVISION RECEIVER FREQUENCY SYNTHESIZER

George Roland Briggs, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,660
Int. Cl.² H04B *1/16*
U.S. Cl. 325—421 **8 Claims**



1. In a television receiver including a tuning apparatus for providing a plurality of local oscillator signals respectively corresponding to a plurality of channels a viewer may select, each of said local oscillator signals being allocated to one of at least two frequency bands wherein it is separated from an adjacent channel by a predetermined frequency spacing, an apparatus comprising:

variable modulus divider means for selectively dividing the frequency of a local oscillator signal by first and second factors in response to a control signal to provide an output signal, said first factor being directly related to said frequency separation between local oscillator signals by an integral number; and

means for generating said control signal to cause said variable modulus divider means to divide by said first factor during a first interval for a first number of periods of said output signal, to divide by said first factor during a second interval for a second number of periods of said output signal, and to divide by said second factor during said second interval for a third number of periods of said output signal, said first number of periods being directly related to the number of said selected channel, said second and third numbers of periods each being related to the frequency band of said selected channel.

4,024,477
RECEIVED SIGNAL FREQUENCY INDICATING SYSTEM

Hiroaki Yamaguchi, Anjo, and Hiroshi Fujinami, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 30, 1975, Ser. No. 573,154
Claims priority, application Japan, May 17, 1974, 49-56030
Int. Cl.² H04B *1/16*; G01R *23/10*
U.S. Cl. 325—455 **1 Claim**

1. A received signal frequency indicating system comprising:

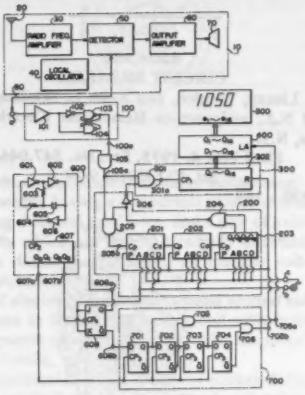
lead wire means connected to a local oscillator of a heterodyne type receiver for taking out a local oscillator signal from said receiver, said lead wire means comprising a coaxial cable having a first wire and a second wire, said first wire being grounded, d.c. voltage source means having first and second lead wires, both ends of said second wire being connected to said first and second lead wires, respectively, for supplying a d.c. voltage, a first a.c. coupling capacitor being connected to said first lead wire to superimpose said local oscillator signal on said d.c. voltage and a second a.c. coupling capacitor being con-

nected to said second lead wire to separate said local oscillator signal from said d.c. voltage, whereby said coaxial cable transmits said d.c. voltage and said local oscillator signal on a single wire;

clock pulse generating means for generating clock pulses of a constant frequency;

frequency dividing means connected to said clock pulse generating means for frequency-dividing said clock pulses to produce a sampling signal having a constant time interval;

gating means connected to said frequency-dividing means and said lead wire means for enabling passage of said local oscillator signal by said sampling signal to produce a sampled local oscillator signal;



first counter means connected to said gating means for counting said sampled local oscillator signal to produce a count signal after a first portion of said time interval which is indicative of an intermediate frequency of the receiver.

second counter means connected to said first counter means and said gating means for counting said sampled local oscillator signal during the remainder of said time interval after said first counter means produces said count signal; and

indicating means connected to said second counter means for indicating the count accumulated by said second counter means during the remainder of said time interval, whereby the received signal frequency is continuously displayed irrespective of said sampling signal.

4,024,478

PRINTED BROADBAND A. C. GROUNDED MICROWAVE TERMINATIONS

Allen Robert Wolfe, Sauquoit, N.Y., assignor to General Electric Company, Utica, N.Y.

Filed Oct. 17, 1975, Ser. No. 622,922

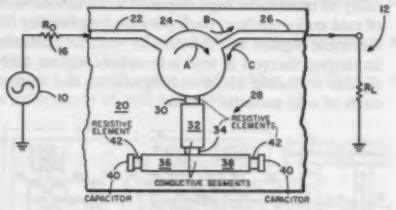
Int. Cl.² H01P *1/38, 1/26*

U.S. Cl. 333—1.1 **2 Claims**

1. An rf printed circuit A.C. grounded, resistive termination network for operation over a range of frequencies comprising, in combination:

a printed A.C. grounded rf transmission line supported on an insulative substrate for coupling an rf signal between an rf source and a load, said printed transmission line including a ferite circulator element connected between the rf source and the load, and

a distributed element network connected to said line and including a plurality of discrete resistive and a plurality of conductive segments interconnected in an alternating resistance-conductance series, said resistive and conductive segments comprising at least one resistive and one conductive segment connected in series between said ferite circulator element and one junction of a parallel combination, each of the branches of said parallel combination comprising a resistive segment and a conductive segment connected in series with a grounded capacitor,



the line length and impedance values of said conductive segments and the resistance values of said resistive segments being selected to minimize the voltage reflection coefficient for said network over the frequency range of said signal.

4,024,479

HF SIGNAL TRANSMISSION DEVICE

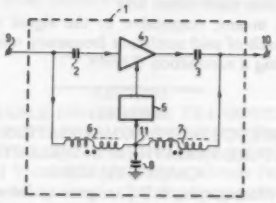
Thijs Jisse de Vries, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 16, 1975, Ser. No. 623,000

Claims priority, application Netherlands, Nov. 7, 1974, 7414505

Int. Cl.² H03H *7/02, 7/14, 7/46;* **H04B** *3/56*

U.S. Cl. 333—8 **4 Claims**



1. A HF signal transmission device having input and output terminals and, between said terminals, HF signal transmission path and a LF supply current transmission path, said HF path including at least one capacitance for blocking said LF supply current, and said LF path comprising, for suppressing the HF signal, a series of at least two pairs of substantially equal coils wound on a non-closed core of a magnetizable material and connected in opposite sense to each other, and a power supply unit connected to the junction point between said coil pairs for tapping hum-free LF supply current.

4,024,480

PROGRAMMABLE, AMPLITUDE AND PHASE, GENERAL TRANSVERSAL FILTER

Thomas Macklin Reeder, Glastonbury, and Thomas Walter Grudkowski, Manchester, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 14, 1976, Ser. No. 676,835

Int. Cl.² H03H *7/28, 9/26, 9/32, 9/02*

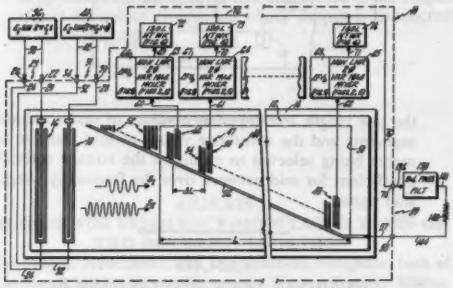
U.S. Cl. 333—70 T **9 Claims**

1. A surface acoustic wave, programmable amplitude and phase general transversal filter apparatus, comprising:

signal source means, for providing a pair of electrical signals, each at a different frequency;

a nondispersive surface acoustic wave delay line including,

a piezoelectric substrate having a major surface, a pair of signal launching transducers disposed on said major surface, each responsive to said electrical signals, and each providing surface acoustic waves in said substrate at a frequency in dependence on a respective one of said electrical signals, said delay line further including a plurality of transducer taps disposed in an interaction region of said major surface, each providing a plurality of sensed electrical signals in response to surface acoustic waves impinging thereon in said interaction region, said sensed signals including electrical signals at the frequency of each of said acoustic waves;



a plurality of nonlinear frequency mixer means, each responsive to said sensed electrical signals from a corresponding one of said transducer taps for providing signal manifestations of the sum and difference frequency of the surface acoustic waves impinging on the tap, each providing said signal manifestations at a signal amplitude which is selectively adjustable and at a selected one of two phases which are displaced by one hundred eighty degrees from each other; and

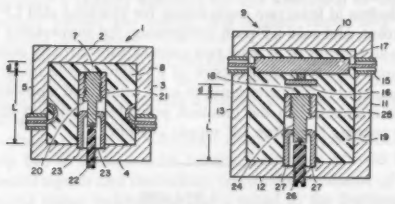
summing means, responsive to the signal manifestations from each of said nonlinear frequency mixer means, for providing a summation thereof.

4,024,481

FREQUENCY DRIFT COMPENSATION DUE TO TEMPERATURE VARIATIONS IN DIELECTRIC LOADED CAVITY FILTERS

Aare Kivi, Massapequa, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Jan. 7, 1976, Ser. No. 647,020
Int. Cl.² H01P *1/30, 7/04*
U.S. Cl. 333—82 BT **13 Claims**



1. An arrangement to compensate for frequency drift due to temperature variation in dielectric loaded cavity filters having a predetermined operating frequency comprising:

a metal TEM coaxial cavity, said metal of said cavity having a selected thermal coefficient of expansion;

a metal shunt inductive rod having a selected length with one end connected to one wall of said TEM cavity and a capacitive gap between the other end of said rod and a member of said TEM cavity, said metal of said rod having a selected thermal coefficient of expansion and said gap having at least one selected physical dimension; and

a solid dielectric material having a selected thermal coefficient of expansion disposed to fill said TEM cavity and said gap;

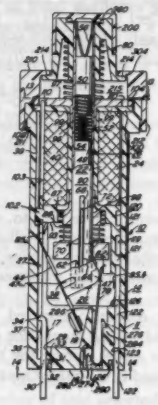
said selected thermal coefficient of expansion of said metal of said TEM cavity, said selected thermal coefficient of expansion of said metal of said rod, said selected thermal coefficient of expansion of said dielectric material, said one selected physical dimension of said gap and said selected length of said rod are all selected relative to each other to equalize the rate of change of the equivalent inductive and capacitive reactance of said TEM cavity so that the difference between the rate of change of the equivalent inductive reactance of said TEM cavity and the rate of change of the equivalent capacitive reactance of said TEM cavity remains zero during a temperature variation at said predetermined operating frequency.

4,024,482

CIRCUIT BREAKER

Albert D. Lisnay, Trenton, and Keith L. Schilling, Irvington, both of N.J., assignors to Heinemann Electric Company, Trenton, N.J.

Filed Feb. 4, 1975, Ser. No. 547,046
Int. Cl.² H01H *9/24*
U.S. Cl. 335—169 **79 Claims**



1. A circuit breaker comprising

a housing,

a pair of contacts enclosed by said housing,

a movable arm within said housing and carrying one of said contacts, and

an electromagnetic sensing device comprising

a coil within said housing

a member movable between a first contacts closed position and a second contacts open position,

an armature movably supported within said housing,

a first latching means operatively connecting said member and said movable arm for maintaining said movable arm in said first contacts closed position, for returning said movable arm to said first contacts closed position, and for permitting said movable arm to move to said second contacts open position upon release of said first latching means,

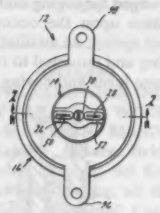
said armature being operatively connected to said first latching means to unlatch said movable arm on sufficient energization of said coil, and

second latching means for maintaining said member in said first contacts closed position and operatively connected to said first latching means for releasing said member and permitting said member to move to said second contacts open position after said first latching means is released.

4,024,483
VARIABLE INDUCTANCE TRANSDUCERS

Lawrence William Tomczak, Sterling Heights; Frederick William Crall, Farmington; LaVerne Andrew Caron, Sterling Heights, and Walter Joseph Campau, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Mar. 17, 1975, Ser. No. 559,204
Int. Cl.² H01F 21/06
U.S. Cl. 336—30 11 Claims



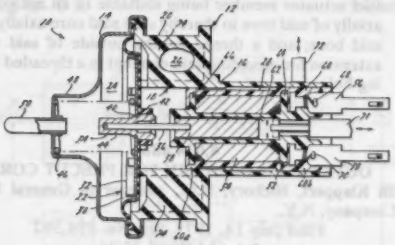
1. A variable inductance transducer comprising:
a plastic bobbin having a cylindrical axially extending body including a central axial bore, and a pair of axially spaced end walls which are directed radially outwardly of said body to define therebetween an annular coil-receiving space around said body;
a length of electrical conductor wound around said body in said space to form an inductive coil with both terminal end segments of said conductor being disposed at one of said end walls;
a pair of electrical terminal-receiving sockets formed in said bobbin axially beyond said one end wall relative to said coil-receiving space, each of said sockets extending into said bobbin from the outer surface thereof so as to provide an open outer socket periphery which faces radially outwardly of said bobbin and axially away from said one end wall;
a pair of electrical terminals, each having a portion thereof disposed in a corresponding one of said sockets and extending through the open outer socket periphery of the corresponding socket to provide an external portion; each terminal being electrically joined to a corresponding one of said electrical conductor terminal end segments;
a plastic enclosure extending axially from the other of said end walls, over said coil and said one end wall to enclose said coil, said enclosure also extending at least through a portion of the open outer periphery of, and partially into, each socket to thereby axially and radially lock each terminal in the corresponding socket;
a core disposed in said bore for axial displacement to vary the inductance of said coil as a function of the axial position of said core with respect to said coil; and
actuating means connected to said core for axially displacing said core with respect to said coil.

4,024,484
VARIABLE INDUCTANCE TRANSDUCER

Lawrence William Tomczak, Sterling Heights; Frederick William Crall, Farmington; La Verne Andrew Caron, Sterling Heights, and Walter Joseph Campau, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 3, 1975, Ser. No. 628,289
Int. Cl.² H01F 21/06
U.S. Cl. 336—30 10 Claims

1. A variable inductance transducer comprising:
a molded plastic housing element comprising a main tubular section defining a central axial throughbore, and a shell section integral with said main tubular section, said shell section comprising an outer axial wall disposed radially outwardly of said main tubular section, and rigidifying rib means integral with said sections extending between the outer wall of said shell and said tubular section;
a complementary shell secured to said shell section, said shell and shell section defining a chamber;
a movable diaphragm dividing said chamber into two chamber portions and having its periphery held between said shell section and said shell;
an inductance coil unit lodged within said throughbore and having an axial bore;
a core which is positionable axially within said bore to vary the inductance of said coil unit;

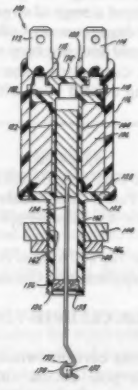


means connecting said core with said diaphragm such that said core is positioned within said bore in accordance with the position of said diaphragm;
spring means disposed within one of said two chamber portions biasing said diaphragm in a given direction; and
means providing a variable pressure differential acting on said diaphragm to displace same against the bias force of said spring means and thereby position said core within said bore in accordance with said variable pressure differential.

4,024,485
VARIABLE INDUCTANCE TRANSDUCER

Lawrence William Tomczak, Sterling Heights; Frederick William Crall, Farmington; LaVerne Andrew Caron, Sterling Heights, and Walter Joseph Campau, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 559,204, March 17, 1975. This application Mar. 11, 1976, Ser. No. 665,998
Int. Cl.² H01F 21/06
U.S. Cl. 336—30 7 Claims



1. A variable inductance transducer comprising:
a molded plastic element forming both a bobbin having an

axial bore and a tubular extension extending axially from one axial end of said bobbin and defining a continuation of said bore;

an inductive coil disposed on said bobbin;

a core disposed within said bore for displacement axially thereof; actuating means for selectively positioning said core with respect to said bore for varying the inductance of said coil comprising an elongated flexible member having one end thereof affixed to said core, extending completely through said tubular extension and having its other end terminating in a shepherd's crook connection which is snapped onto a circular cylindrical actuator member to engage the circular circumference thereof, said actuator member being shiftable in an arc generally axially of said bore to thereby shift said core axially within said bore; and a thread on the outside of said tubular extension for mounting said element in a threaded mounting hole.

4,024,486

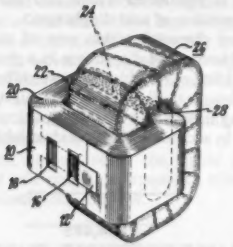
OUTER LOCKING TURN FOR PRECUT CORE

Willi Klappert, Hickory, N.C., assignor to General Electric Company, N.Y.

Filed July 14, 1975, Ser. No. 595,592

Int. Cl.² H01F *27/26*

U.S. Cl. 336—210 **1 Claim**



1. An outer locking turn locking precut induction core of an electrical apparatus comprising;

a strip or magnetic core steel extending about the outside of a nested magnetic induction core, the ends of said strip overlapping, one end of said strip having a locking tab and the other end of said strip having a pair of locking slots, said locking tab engaging and locking with either of said locking slots, said locking turn being locked by engagement of said locking tab with one of said slots at a point displaced from a zone of stress having been created in said tab by the engagement of said tab with the other of said slots when said locking turn was locked about said nested magnetic core during the forming of said core prior to the lacing of said core with a coil.

4,024,487

MULTIPOLE EXCESS CURRENT SWITCH

Fritz Krasser; Josef Peter, and Rainer Völkl, all of Altdorf, Germany, assignors to Ellenberger & Poensgen GmbH, Altdorf, Germany

Filed Feb. 10, 1976, Ser. No. 656,952

Claims priority, application Germany, Feb. 21, 1975, 2507454

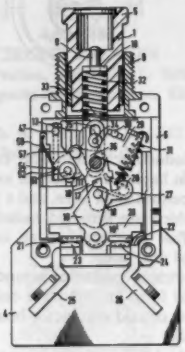
Int. Cl.² H01H *73/30*

U.S. Cl. 337—46 **11 Claims**

1. A multipole excess current switch assembly comprising:

at least two single pole excess current switches ganged together to open simultaneously; at least two housings each enclosing a respective switch; first and second guides provided in said housings; a common shaft extending through each of said switches and movable relative to said housings along said first guides; wherein

each said switch comprises: an angle lever rotatably mounted on said shaft; a release spring connected to said angle lever; a one-armed lever coupled to said angle lever; a contact bridge articulatedly connected to said one-armed lever and including an articulation shaft guided by said second guide in its respective housing; a pivotally mounted release lever mounted for securing said angle lever against rotational movement about said shaft when said switch is in its ON position; a U-shaped bent bimetal strip arranged for urging said release lever into an ineffective position upon the occurrence of an excess current; a further spring; an auxiliary lever connected to said further spring and mounted to rotate about the same axis as said release lever and having a stop against which



said release lever rests, when said switch is in its ON position under the action of said further spring; and an actuating member mounted on said angle lever for urging said auxiliary lever together with said release lever to their ineffective positions;

wherein said assembly further comprises: means connecting together said auxiliary levers of all of said switches; and

wherein one of said switches further comprises: a manually actuatable push button operatively connected to one of said switches for manually switching said assembly on and off; a disconnection spring disposed to act on said push button; an operating rod rigidly connected with said push button and arranged to act on said common shaft; and a locking pawl arranged for arresting said shaft with said contact bridges in the position corresponding to the ON position of said switches.

4,024,488

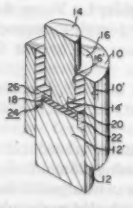
SELF-RESTORING TYPE CURRENT LIMITING DEVICE

Toshihide Kamino, Kishiwada, Japan, assignor to Terasaki Denki Sangyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 17, 1975, Ser. No. 641,586

Int. Cl.² H01H *87/00*

U.S. Cl. 337—114 **5 Claims**



1. A self-restoring type current limiting device comprising,

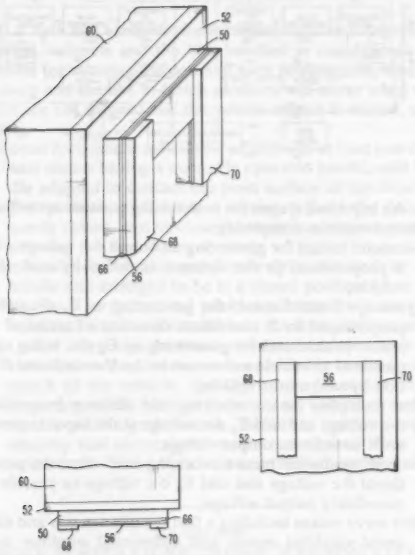
in combination, a first electrode, a second electrode opposite to said first electrode, an electrically insulating plate and an electrical insulation with a through hole disposed in opposite relationship between said first and second electrodes to form a gap between said insulating disc and said insulation, an amount of self-restoring type current limiting material filling said gap to form a current passageway between said first and second electrodes, and an annular narrow gap portion disposed in one part of said current passageway, said self-restoring type current limiting material being responsive to an overcurrent flowing therethrough to be first evaporated in that portion of said annular narrow gap portion radially outwardly running.

4,024,489

MAGNETORESISTIVE SANDWICH INCLUDING SENSOR ELECTRICALLY PARALLEL WITH ELECTRICAL SHUNT AND MAGNETIC BIASING LAYERS

Christopher Henry Bajorek, Goldens Bridge; Robert Douglas Hempstead, Yorktown Heights; Sol Krongelb, and Ashok Frank Mayadas, both of Somers, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1975, Ser. No. 633,047
Int. Cl.² H01H *39/00*; G11B *5/30*; H01C *7/16*
U.S. Cl. 338—32 R **14 Claims**



1. A thin film magnetoresistive sensor consisting of a smooth substrate surface,

a first thin film layer of a magnetoresistive sensor material deposited upon said substrate surface,

an intermediate nonmagnetic thin film separating, shunt layer comprising a relatively high resistivity nonmagnetic material in physical and electrical contact with said first layer,

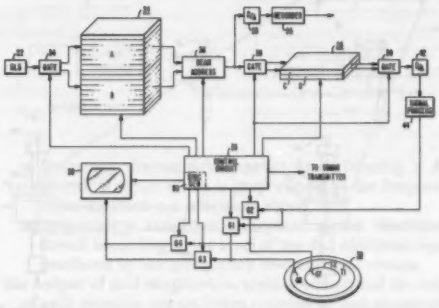
an upper biasing thin film layer of an electrically conductive, magnetic biasing material for magnetically biasing said first layer deposited upon said intermediate layer in physical and electrical contact with said intermediate layer.

4,024,490

MULTIBEAM SIDELOOKING SONAR DISPLAY SYSTEM

Kenneth E. Wood, Annapolis, and Wesley E. Stevens, Severna Park, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 27, 1976, Ser. No. 661,922
Int. Cl.² G01S *9/66*, *7/62*; H04N *7/18*
U.S. Cl. 340—3 R **9 Claims**



1. A display system for a multibeam sidelooking sonar system which operates in repetitive transmission cycles during travel over a target area and wherein a plurality of received beam signals is provided as a result of each said transmission, comprising:

A. display means for displaying said signals;

B. a rotating storage means;

C. first and second storage means each including two storage sections;

D. means for placing said received signals into one of said sections of said first storage means and reading out previously stored received signals, in a sequential manner, from the other said section;

E. means for alternately placing said read out signals into said first and second sections of said second storage means;

F. means for reading out said signals from said second storage means and placing said read out signals into locations of said rotating storage means;

G. means for reading said signals from said rotating storage means and providing them to said display means; and

H. means for relatively moving the displayed information on said display means, in accordance with movement over said target area.

4,024,491

WIRELESS MARINE NAVIGATIONAL AID SYSTEM

William Dodd Pellerin, Houston; Peter Webb Higgins, Cypress, and Joseph Henery Parnell, III, Houston, all of Tex., assignors to Tideland Signal Corporation, Houston, Tex.

Filed July 18, 1975, Ser. No. 597,064
Int. Cl.² G01V *1/00*; H04B *13/00*; H04R *15/00*
U.S. Cl. 340—5 R **4 Claims**

1. An acoustical navigational light system having a transmitter and at least one receiver for controlling the actuation of a marine navigational aid connected to each of the transmitter and the receiver comprising, said transmitter including,

a crystal oscillator timing clock,

digital counter means connected to the clock output,

a programmed digital read only memory connected to the

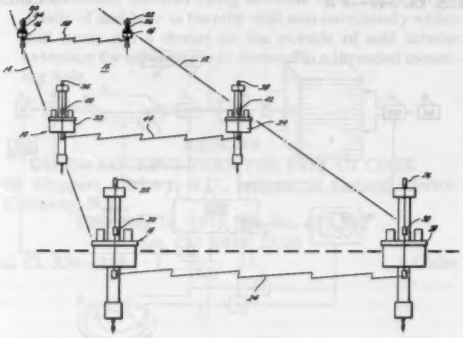
counter output and providing a coded signal output of short and time related pulses of less than one second duration for transmission through the water to the receiver,

a navigational light aid connected to and receiving an actuating signal from the counter means, said receiving including,

a crystal oscillator timing clock,

digital counter means connected to the clock output for providing timing signals,

a navigational light air connected to and receiving an actuating signal from the counter means,



a detector for detecting the coded acoustical signal from the transmitter,

second digital counter means receiving said coded acoustical signal,

a programmed digital read only memory connected to the second counter means and having a coded memory providing an output identical to the coded signal output of the transmitter memory,

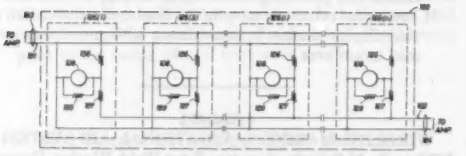
a digital comparator connected to the dectector and to the receiver memory for determining if the proper actuating code is received by the receiver, said comparator connected to and resetting the first counter means when the receiver receives a correct signal from the transmitter.

4,024,492

SEISMIC ARRAY

William H. Mayne; William S. Hawes, and Algernon S. Badger, all of Houston, Tex., assignors to Geosource Inc., Houston, Tex.

Filed Feb. 9, 1976, Ser. No. 656,528
Int. Cl.² G01V *1/20, 1/22*
U.S. Cl. 340—15.5 MC **22 Claims**



1. A seismic array having bidirectional capabilities, which comprises:

a plurality of seismic detector connection points;

a seismic detector at each seismic detector connection point;

a first resistor at each seismic detector connection point, the first resistor having one end connected to one output of the seismic detector;

a first pair of wires which interconnects the seismic detector connection points and which emerges from the first end of the seismic array, the first wire of the first pair being connected to the second end of the first resistor at each seismic detector connection point and the second wire of said pair being connected to the other output of each seismic detector;

a second resistor at each seismic detector connection point, the second resistor having one end connected to one output of each seismic detector; and

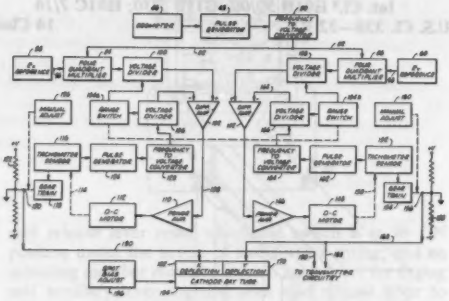
a second pair of wires which interconnects the seismic detector connection points and which emerges from the second end of the array, the first wire of the second pair being connected to the second end of the second resistor at each seismic detector connection point and the second wire of the second pair being connected to the second output of each seismic detector.

4,024,493

APPARATUS FOR MOTOR VEHICLE POSITION INDICATION

George W. Ingels, 2310 Ravenwood, Rte. 4, Norman, Okla. 73069

Filed June 7, 1974, Ser. No. 477,283
Int. Cl.² G06F *15/48*
U.S. Cl. 340—23 **12 Claims**



1. An improved system for maintaining position surveillance of motor vehicles comprising:

odometer means for generating an output d-c voltage which is proportional to the distance travelled by said motor vehicle;

gyroscope control means for generating an E_x d-c voltage proportional to X coordinate direction of travel of said motor vehicle and for generating an E_y d-c voltage proportional to vehicle movement in the Y coordinate direction by said motor vehicle;

first multiplier means receiving said distance proportional d-c voltage and said E_x d-c voltage at the input to provide an X coordinate output voltage;

second multiplier means receiving said distance proportional d-c voltage and said E_y d-c voltage to provide a Y coordinate output voltage;

first servo means including a first d-c drive motor and differential amplifier means, said differential amplifier means receiving as input said X coordinate output voltage to provide drive output to said first d-c motor to produce first rotational output, and including tachometer sensor means responsive to said rotational output to feedback a servo control voltage for input to said differential amplifier;

second servo means including second d-c drive motor and differential amplifier means, said differential amplifier means receiving as input said Y coordinate output voltage to provide drive output to said second d-c motor to produce second rotational output, and including tachometer sensor means responsive to said rotational output to feedback a servo control voltage for input to said differential amplifier; and

first deflection potentiometer means wherein the wiper element thereof is bidirectionally driven by said first

rotational output to provide an X deflection voltage output;

second deflection potentiometer means wherein the wiper element thereof is bidirectionally driven by said second rotational output to provide a Y deflection voltage output; and

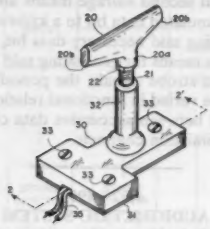
cathode ray tube means providing a visible spot having its position controlled in response to X and Y deflection as controlled respectively by said X and Y deflection voltages.

4,024,494

REFRIGERATOR DOOR LOCK WITH ALARM

F. Joseph Quesnel, 141 Peacock Drive, Altamonte Springs, Fla. 32701

Filed June 17, 1976, Ser. No. 696,948
Int. Cl.² G08B 21/00
U.S. Cl. 340—52 R 10 Claims



1. A lock and alarm device for attachment to refrigerators, freezers, cabinets and the like installed in recreational-type vehicles for securing the doors of such refrigerators, freezers, cabinets and the like in which an alarm will occur when such doors are not secured and the vehicle engine is started, comprising:

friction lock means mountable adjacent to at least one door, said means having a manually operable handle, said handle adapted to contact the front surface of the door in a first position, such contact serving to hold the door securely closed, and to clear the door in a second position allowing the door to be opened;

electrical contact means operatively connected to said handle and arranged to be in a closed position when said handle is in the second position, and to be in an open condition when said handle is in the first position; and

electrical alarm signal means connected in series with said electrical contact means and connectable to the ignition switch of the vehicle, thereby forming a series circuit consisting of the vehicle battery, said electrical contact means, said signal means, and the ignition switch; whereby said alarm signal means is energized when said lock is in the second position at a time when the ignition switch is closed.

4,024,495

REMOTE TEMPERATURE CHANGE WARNING SYSTEM

Frank J. O'Brien, 125 Mira St., Foster City, Calif. 94404

Filed Dec. 29, 1975, Ser. No. 644,593
Int. Cl.² B60Q 1/00
U.S. Cl. 340—57 4 Claims

1. A remote temperature change warning system for a refrigeration vehicle having existing vehicular wiring comprising

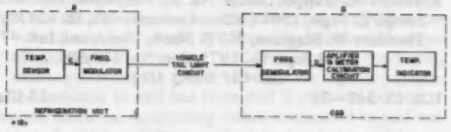
a temperature sensing circuit located in the refrigeration compartment of said refrigeration vehicle, said temperature sensing circuit comprising

a linear electrical transducer means for producing at the output thereof a d.c. electrical signal proportional to the temperature in said refrigeration compartment,

a frequency modulation circuit means in electrical connection with the output of said electrical transducer means, said frequency modulation circuit means generating at its output an a.c. electrical signal having a frequency proportional to the d.c. electrical signal produced by said electrical transducer means whereby an a.c. electrical signal is generated by said temperature sensing circuit having an audio frequency proportional to the temperature in said refrigeration compartment, and

means for approximately matching the output impedance of said temperature sensing circuit to the impedance of said existing vehicular wiring, and

a detection circuit located on said vehicle remote from said temperature sensing circuit, said detection circuit comprising



a frequency discriminator means for producing a d.c. electrical signal which is proportional to the frequency of an inputted a.c. electrical signal, and

a temperature condition indication means electrically driven according to the level of the d.c. electrical signal produced by said frequency discriminator means,

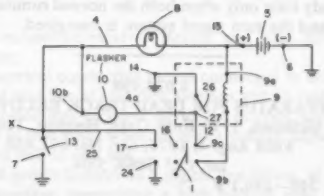
the output of said temperature sensing circuit and the input of said detector circuit being coupled to and electrically connected through the existing electrical wiring of said refrigeration vehicle whereby the indication on said temperature condition indication means is electrically determined by the temperature in the remote refrigeration compartment of said refrigeration vehicle.

4,024,496

VEHICLE WARNING ASSEMBLY

Ernest L. Stover, 1030 North St., Lockport, Ill. 60441

Filed Apr. 27, 1976, Ser. No. 680,688
Int. Cl.² B60R 25/10
U.S. Cl. 340—63 12 Claims



1. A vehicle warning assembly connected to the electrical system and power source of said vehicle, including a first circuit, first switch means connected in said first circuit and being movable between a circuit-armed position and a circuit-disarmed position, said first circuit being connected to said power source, signal means connected in series in said first circuit, second switch means actuated by movement at entrance means to said vehicle to close said first circuit and energize said signal means, a second circuit in parallel with said signal means, third switch means connected between said second circuit and said power source, said third switch means including normally open contacts closeable on energizing said signal means and said second circuit in parallel therewith when said first switch means is in said circuit-armed position, said normally open contacts remaining closed to complete a connection between said power source and said second circuit

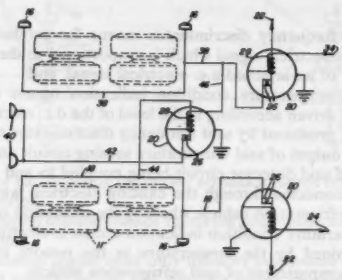
after said second switch means has been opened and until said first switch means is moved to a circuit-disarmed position, fourth switch means connected in said first circuit in series with said signal means and being movable between a circuit-open and a circuit-closed position, an exterior switch operator mountable on said vehicle for access from outside of said vehicle, said switch operator connected to operate said fourth switch means, said signal means in said first circuit being energized when said fourth switch means in series therewith is moved to a circuit-closed position by said exterior switch operator.

4,024,497

TRAILER PROTECTOR LIGHT SYSTEM

Raymond A. Ruppel, Route No. 5, Vincennes, Ind. 47591; Joseph Z. Fagle, 1304 Collins, Lawrenceville, Ill. 62439, and Theodore W. Blagrave, 703 S. Ninth, Vincennes, Ind. 47591

Filed Sept. 16, 1975, Ser. No. 613,800
Int. Cl.² B60Q *1/26*
U.S. Cl. 340—74 **12 Claims**



1. A trailer protector light system for use with an over-the-road machine having rear wheels which are difficult to observe at night, the system comprising:

a. additional lights for mounting at the rear of the machine; and

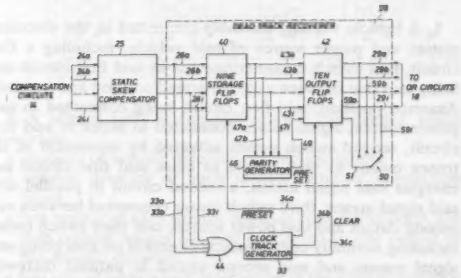
b. means for connecting and operating said lights from the existing lighting system of the machine which includes both the running lights wiring and the turn signal lights wiring so that the additional lights will be energized to a steady state only when both the normal running lights are on and the turn signal system is energized.

4,024,498

APPARATUS FOR DEAD TRACK RECOVERY

Billy L. McIntosh, 1710 Huge Oaks, Houston, Tex. 77055

Filed Aug. 4, 1975, Ser. No. 601,456
Int. Cl.² G06K *5/04*
U.S. Cl. 340—146.1 F **22 Claims**



1. Apparatus for recovery of missing data bits in reading static skew compensated parallel data tracks having at least two channels for parallel transmission of data bits, comprising the combination of

first storage means for receiving said data bits from each of said channels and storing said received data bits therein, said first storage means responsive to a first periodic strobe signal for clearing said received data bits from said first storage means,

second storage means responsive to a second periodic strobe signal for causing said second storage means to receive said data bits from the output of said first storage means, said second storage means responsive to a third periodic strobe signal for clearing said received data bits therefrom,

means for detecting the absence of a necessary data bit in one of said parallel data bit channels at the ouput of said first storage means and generating a simulated data bit in response thereto, said generated data bit being applied as an input to said second storage means,

switch means for receiving said simulated data bit from the output of said second storage means and selectively applying said simulated data bit to a known parallel data bit channel missing said necessary data bit, and

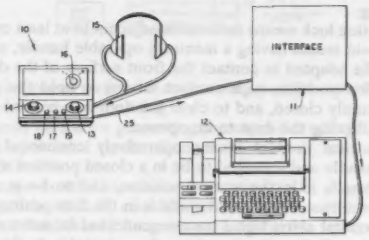
clock generator means for generating said first, second and third periodic strobe signals, the periodic occurrence of which may be varied in functional relation to the average time interval between successive data characters in said parallel transmission channels.

4,024,499

AUDIOMETRIC SYSTEM

Jack F. Bosscher, Lake Worth, Fla., assignor to Oto-Data, Inc., Atlanta, Ga.

Filed June 24, 1974, Ser. No. 482,002
Int. Cl.² H04M *1/00*
U.S. Cl. 340—146.2 **17 Claims**



1. Audiometric data conversion apparatus for converting audiometer switch position settings to printable output data, comprising:

first circuit means connected to receive a present input signal condition corresponding to a present position of a first selectively variable input switch means;

second circuit means operative to retain a prior input signal condition corresponding to a prior position of said first switch means, said second circuit means being selectively operative to receive such prior input signal condition previously received in said first circuit means;

comparison means responsive to said present input signal condition retained in said first circuit means and to said prior input signal condition in said second circuit means, said comparison means being operative to provide an output signal condition corresponding to a relation between the prior and the present positions of the switch means;

third circuit means selectively operative to receive the present input signal condition only in response to a predetermined ouput signal condition from said comparison means indicating that a certain said relation exists between said present and prior switch positions; and

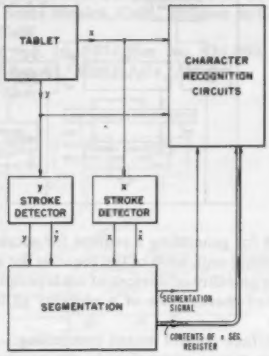
sequential control means initially operative in response to a control signal condition which is independent of said input signal conditions to operate said third circuit means, and subsequently operative to transfer said present input signal condition to said second circuit means in substitution of said prior input signal condition previously retained therein.

4,024,500

SEGMENTATION MECHANISM FOR CURSIVE SCRIPT CHARACTER RECOGNITION SYSTEMS

Noel Martin Herbst, Mount Kisco, and John Henry Morrissey, Chappaqua, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,841
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 SG 18 Claims



1. A character segmentation mechanism for cursive handwriting which comprises:

means for obtaining continuous X and Y coordinate data and the instantaneous X and Y velocities associatted therewith as a writing stylus is moving,

means for detecting when a Y extremal is encountered (Y velocity = 0),

means for detecting when an X extremal (X velocity = 0) is encountered,

means for successively averaging the X displacement values associated with a particular segment whenever either extremal is encountered, whereby the average is updated each time,

means for comparing the X displacement value associated with each X extremal to see if its magnitude is more than a predetermined threshold value above the current average X displacement value, and

means for specifying that a segmentation should occur when the said displacement value is greater than said predetermined amount.

4,024,501

LINE DRIVER SYSTEM

William M. Herring, Campton Township, Kane County; James P. Johnson, Warrenville, and Dennis B. Walling, Darien, all of Ill., assignors to Standard Oil Company, Chicago, Ill.

Filed Sept. 3, 1975, Ser. No. 609,942
Int. Cl.² H04Q 1/00
U.S. Cl. 340—147 R 15 Claims

1. A line driver system for digital communication between an electronic transmitter device and an electronic receiver device which comprises:

an electronic transmitter-receiver device, at a first location, having an output and an input, said transmitter-receiver device being constructed to provide digital information to said output as logic-level voltage signals only if there is a voltage signal at said input just prior to said transmitter-receiver device being operative to provide said signals to said output;

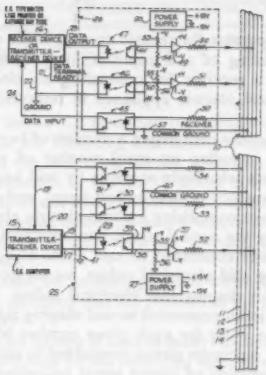
an electronic receiver device, at a second location, having an input to receive logic-level voltage signals and an output, said receiver device being constructed to convert logic-level voltage signals from its said input to a readable form and to provide at its said output a voltage signal while said receiver device is in an on-line condition to provide said conversion of said logic-level voltage signals when received at said input of said receiver device;

a bus extending between said first and second locations and including first and second lines;

a first power booster as a digital line driver, at said first location, comprising a high current gain amplifier with unity voltage gain and having an output and an input;

first electrical conducting means connected to said first line only of said bus, at said first location, and to said output of said first power booster, said first electrical conducting means providing the only connection for logic-level signal transmission to said bus from said first power booster;

second electrical conducting means connected to said output of said transmitter-receiver device and to said input only of said first power booster, said second electrical conducting means providing the only connection between



said transmitter-receiver device and said first power booster;

third electrical conducting means connected to said second line of said bus at said first location and to said input of said transmitter-receiver device to provide said voltage signal at that input when there is a voltage signal on said second line of said bus;

a second power booster as a digital line driver, at said second location, comprising a high current gain amplifier with unity voltage gain and having an output and an input;

fourth electrical conducting means connected to said second line only of said bus at said second location and to said output of said power booster, said fourth electrical conducting means providing the only connection for logic-level signal transmission to said bus from said second power booster;

fifth electrical conducting means connected to said output of said receiver device and to said input only of said second power booster, said fifth electrical conducting means providing the only connection between said receiver device and said second power booster; and

sixth electrical conducting means connected to said first line of said bus at said second location and to said input of said receiver device to provide said voltage signal at said output of said receiver device to said second line of said bus.

4,024,502
DEVICE FOR REMOTE CONTROL OF ELECTRICAL POWER UNITS

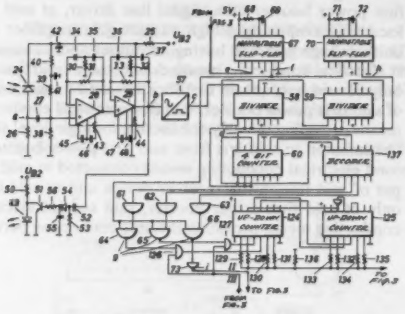
Helmut Eberwein, Brendlorenzen; Alfred Vogt, Bad Neustadt-Herschfeld, and Paul Greb, Heustreu, all of Germany, assignors to Preh Elektrofeinmechanische Werke, Jakob Preh Nachf., Bad Neustadt, Saale, Germany

Filed Oct. 23, 1975, Ser. No. 625,123

Claims priority, application Germany, Oct. 23, 1974, 2450293

Int. Cl.² H03K *5/20*

U.S. Cl. 340—147 R **15 Claims**



1. An apparatus for remote control of an electrical appliance, consisting of a transmitter for producing an optical signal and a receiver for controlling an electronic control circuit of said electric appliance in response to the optical signal,

the transmitter comprising a number of keys and a multivibrator including an equal number of pairs of control elements selectively actuable by said keys to determine the frequency of said optical signal, and

the receiver comprising a photo-electric element for transforming the optical signal into electrical pulses, a band pass filter connected to said photo-electric element for filtering said electrical pulses, means connected to said filter for shaping said electrical pulses, a frequency divider circuit connected to said shaping means for producing one pulse for each given number of said electrical pulses, a counter circuit connected to said divider circuit for producing an output signal indicating the number of pulses produced by said divider circuit in a given time and hence the frequency of said optical signal, a 1-out-of-*n* decoder connected to the output of said counter circuit for producing a decoded signal indicating said frequency, a timer circuit connected to said counter circuit for producing a periodic timer signal for resetting said counter circuit at the end of said given time, and means for comparing the output of said decoder with the output of said timer circuit and producing a control signal applied to said electronic control circuit.

4,024,503
PRIORITY INTERRUPT HANDLING SYSTEM

Luigi Mercurio, Milan, and Guido Badagnani, Segrate (Milan), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Continuation-in-part of Ser. No. 92,777, Nov. 25, 1970, abandoned. This application Mar. 26, 1974, Ser. No. 454,973

Claims priority, application Italy, Nov. 25, 1969, 54152/69; Sept. 25, 1970, 70229/70

Int. Cl.² G06F *9/16, 9/18*

U.S. Cl. 340—172.5 **8 Claims**

1. A desk-top electronic computer system having a central processing unit for executing a program comprising a series of instructions, said system having at least one peripheral unit, said central processing unit including:

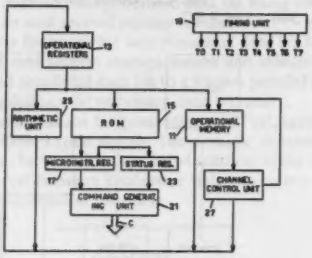
a memory for storing microprograms made up of a predetermined set of microinstructions which correspond to selected program instructions, at least one microprogram being provided for operation of each peripheral unit,

means for storing a microinstruction read out from said memory,

command generating logic controlled by said means for storing generating executing commands for each of said stored microinstructions,

interface control means interconnecting said central processing unit and said peripheral units,

each peripheral unit including a plurality of devices, each of said devices being conditionable by said interface control



means for generating a request for access to said central processing unit, each of the requests for access generated by the plurality of devices of each peripheral unit having assigned thereto one of a plurality of different priority levels.

said interface control means comprising:

analyzing means responsive to the requests for access of different priority levels to generate an interrupt signal corresponding to the request for access of the highest priority level, and

interrupt control means cooperating with each peripheral unit and responsive to the interrupt signal generated by said analyzing means for enabling the microprogram for the peripheral unit including the device assigned to the highest priority level.

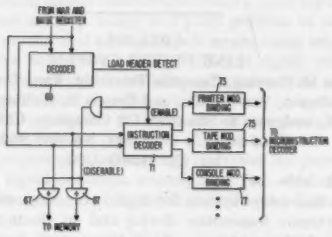
4,024,504
FIRMWARE LOADER FOR LOAD TIME BINDING

Patrick J. Chowning, Royal Oak, Mich.; Diane W. Cikoski, and Thomas R. Cikoski, both of Downingtown, Pa., assignors to Burroughs Corporation, Detroit, Mich.

Filed Dec. 21, 1973, Ser. No. 427,063

Int. Cl.² G06F *3/00*

U.S. Cl. 340—172.5 **7 Claims**



1. A method for storing both microinstructions and source level instructions in a shared memory of a data processor, comprising the steps of:

storing a plurality of firmware modules in auxiliary storage outside of the shared memory;

specifying particular ones of said plurality of firmware modules needed to run a particular program;

translating said firmware module specifications at load time of said particular program into a set of required firmware modules;

loading each firmware module in said set of required firmware modules into an area in the shared memory;

separating said area in the shared memory so loaded from a user dumpable area; and

loading source level instructions into the shared memory at a location outside said separated area.

4,024,505

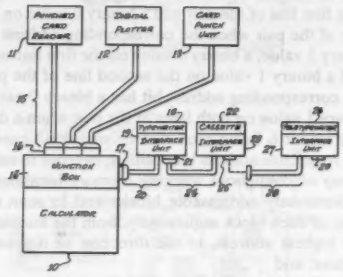
INTERFACE SYSTEM FOR COUPLING AN INDETERMINATE NUMBER OF PERIPHERAL DEVICES TO A CENTRAL PROCESSING UNIT

Irving Sperling, Santa Monica, Calif., assignor to Compucorp, Los Angeles, Calif.

Filed Nov. 18, 1974, Ser. No. 524,802

Int. Cl.² G06F *3/04, 11/00*

U.S. Cl. 340—172.5 **22 Claims**



1. A data processing system comprising a central processing unit having a receptacle through which an interface unit of a peripheral device is connected by an associated cable, said interface unit having a receptacle to which another interface unit may be connected by its own associated cable such that separate cables associated with seperate interface units are connected in series, and the interface units are connected in parallel to the central processing unit through the series connected cables, each interface unit being connected to a particular device having its own function of inputting and outputting data words to and from said central processing unit, each interface unit being assigned a unique address code, particular mode-control codes and particular function control codes, and each interface unit having a single input register to receive output words from said central processing unit through said series connected cables, each of said output words being comprised of a predetermined number of binary digits representing either an address code and a mode-control code combined, a function control code or data, means connected to said input register for decoding an address code and a mode control code to select a particular device for a particular mode of operation, means conected to said input register for decoding a function code for controlling a particular function of said particular device within said particular mode, and means responsive to mode control signals transmitted by said central processing unit over said series-connected cables for controlling the utilization of output words stored in said input register as an address code and mode-control code combined, a function control code or data, each interface unit further having gating means for transmission of input data words to said central processing unit through said series-connected cables, each of said input data words being comprised of a predetermined number of binary digits, said gating means being connected to be responsive to said mode-control decoding means.

4,024,506

CONTROL DEVICE FOR A MATRIX PRINTER

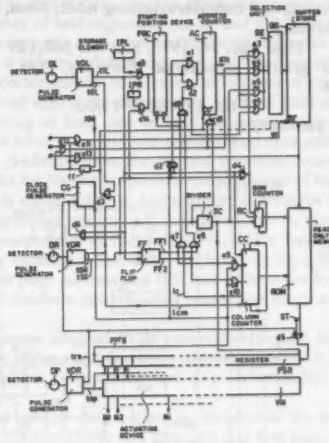
Hans Spaargaren, Rijswijk, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,581

Claims priority, application Netherlands, Mar. 8, 1974, 7403130

Int. Cl.² G06F *3/12*

U.S. Cl. 340—172.5 **5 Claims**



1. A control device for actuating recording elements in a recording device for recording characters composed of discrete elements, the recording device including a member which is reciprocatable in the line direction in front of a recording sheet, from one extreme position to another extreme position, the recording elements being arranged at a predetermined distance from each other and forming at least one group, comprising

measuring means for supplying signals which indicate the movement, direction and the position of the reciprocatable member;

a buffer store for storing at least as many characters as there are to be recorded on the recording sheet during a single movement of the reciprocatable member;

addressing means for said buffer store;

a character generator for supplying character shape information;

a row counter having a first counting capacity for addressing the separate rows of elements constituting the characters in said character generator;

a column counter having a second counting capacity for addressing the separate columns constituting the characters in said character generator;

an element information register in which for each recording element the element information can be stored, and wherein the recording elements can be actuated in response to a control pulse;

means for performing recording actions during the movement of the movable member from the said other extreme position to the said one extreme position;

means for supplying the starting position device with an address code which corresponds to an address which indicates the number of character positions the last recording element, viewed from the other extreme position, situated from the 0^{th} character to be recorded on a line, said code being stored in the buffer store for supplying the starting position device; and

means for ensuring that, in the other extreme position of the movable position of the movable member, the column counter is in its highest position, and that the column

counter code can be decreased by 1 after each recording action.

4,024,507
ARRANGEMENT FOR MONITORING THE STATE OF MEMORY SEGMENTS

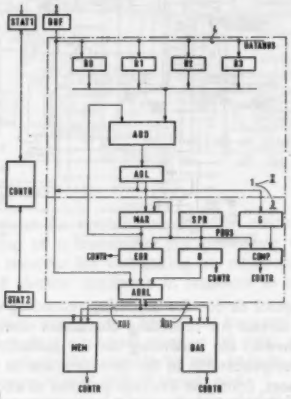
Klaus Berkling, St. Augustin, and Werner Kluge, Bensberg-Refrath, both of Germany, assignors to Gesellschaft fur Mathematik und Datenverarbeitung mbH, Bonn, St. Augustin, Germany

Filed Apr. 14, 1975, Ser. No. 568,129

Claims priority, application Germany, Apr. 13, 1974, 2418034

Int. Cl.³ G06F *11/00*

U.S. Cl. 340—172.5 **7 Claims**



1. In a system for monitoring the working memory of a computer equipped with a processing unit in order to locate, upon request by a program being carried out in the computer and under control of respective algorithms, a group of L contiguous unoccupied memory locations, mark such locations as occupied and make them available for use by such requesting program, and in order to release a previously occupied group of memory locations no longer needed by such program and mark such locations as unoccupied, and in order to specially treat those working memory locations which contain base addresses, constituting pointers to other groups of working memory locations, the improvement comprising:

means including a 1-bit direct access memory state register and a 1-bit direct access base address status register, each register containing an address decoder and having a plurality of single bit stages, with each stage corresponding to a respective location of the working memory, means for connecting said memory state register to the working memory for setting each stage of said memory state register to one binary state when its corresponding working memory location is occupied and to the opposite binary state when its corresponding working memory location is unoccupied, and means for connecting said base address status register to the working memory for setting each stage of said base address status register to the one binary state when its corresponding working memory location is occupied by a base address and to the opposite binary state when its corresponding working memory location is not occupied by a base address;

a first group of status flip-flops arranged to provide signals indicating the algorithm to be executed by said system and arranged to be set by, and interrogated by, the computer processing unit;

a second group of status flip-flops connected to control inputs of said state register and said status register and providing signals indicating which of said state register and status register is to be subjected to an operation;

arithmetic-logic function unit means including an adder circuit and an indicator circuit connected to said state register and said status register, said indicator circuit including a forward-backward shift register, a memory address register having inputs connected to said adder circuit and to the output of said shift register, an addressing logic having pairs of outputs connected to the address decoders of said memory state register and said base address status register for transmitting address signals thereto, each pair of outputs being associated with a respective address bit position; means connecting the outputs of said shift register and said memory address register to an input of said addressing logic, and a don't care logic having an input connected to the output of said shift register and an output connected to an input of said addressing logic and arranged to produce don't care address bits for addressing blocks of stages in said memory state register and said base address status register;

said indicator circuit including means for producing, at each pair of outputs of said addressing logic: a binary 1 value on a first line of the pair and a binary 0 value on a second line of the pair when the corresponding address bit has a binary 1 value; a binary 0 value on the first line of the pair and a binary 1 value on the second line of the pair when the corresponding address bit has a binary 0 value; and a binary 1 value on both lines of the pair when a don't care address bit is being produced by said don't care logic at the respective address bit position, in order to subdivide a group of contiguous working memory locations into simultaneously addressable blocks and to scan the locations of each block sequentially, from the location having the highest address, in the direction of descending addresses; and

a control mechanism connected to said first and second groups of status flip-flops and to said function unit means for setting said status flip-flops, under control of signals from said function unit means and the computer processing unit, in a manner to selectively perform any selected one of:

a first operating sequence in response to a corresponding instruction from the computer processing unit, for searching, starting from an aribtrarily selected memory location, both of said state register and status register simultaneously to locate in each of said state register and said status register a group of L contiguous register stages which are all in the opposite binary state,

a second operating sequence, in response to a corresponding instruction from the computer processing unit, for setting, to the one binary state, each stage of said base address status register which corresponds to a working memory location containing a base address,

a third operating sequence, in response to a corresponding instruction and signals indicating a particular base address and a given group length, for setting to the opposite binary state a number of stages of said memory state register corresponding to such length and starting from the stage corresponding to such base address, and

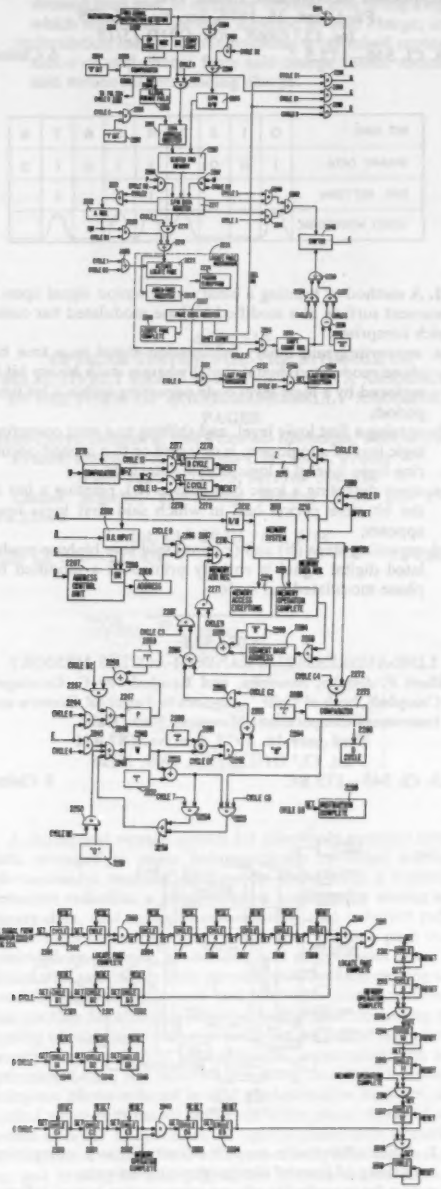
a fourth operation sequence, in response to an instruction generated in said system, for searching both of said state register and said status register for the occurrence of the opposite binary state in a stage of said state register and the occurrence of the one binary state in the corresponding stage of said status register, indicating that the corresponding working memory location contains a base address, and, subsequent to locating such occurrence, setting such status register stage to the opposite binary state.

4,024,508

DATABASE INSTRUCTION FIND SERIAL

Charles W. Buchman, Lexington, and Benjamin S. Franklin, Cambridge, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 19, 1975, Ser. No. 588,435
Int. Cl.² G06F *9/20, 9/16, 13/00*
U.S. Cl. 340—172.5 **9 Claims**



1. In an internally programmed data processing apparatus having a memory comprised of a plurality of segments of addressable space each segment having a segment number associated with one each segment for identifying its associated segment, each of said segments delineated by upper and lower variable bounds, each of said segments being further subdivided into at least one page located at a predetermined displacement address within said segment and having an identifying page number, each of said pages for storing a plurality of files of database records grouped in sets of database records, each set having at least one owner record, each of said pages also including offset address information for locating any one of said database records of a selected one of said sets from a predetermined location in a selected one of said pages; said data processing apparatus also having a system base for locating relative to said system base the absolute location of predetermined ones of said segments, pages, and database records; said data processing apparatus further having an index register for storing a selected database-index address comprised of a database pointer address for forming an address of a predetermined one of said database records, each of said database records having at least one of said database pointers comprised of an area, page and line address, said area address for locating a predetermined file of said database record, said page address for locating a predetermined group of said database records within said file, and said line address for locating the predetermined one of said database records; instruction hardware, responsive to find serial instruction having a first number for locating a first index register storing a first area address, first page address and first line address for locating a first of said database records, said instruction hardware comprising:

a. first means coupled to be responsive to said first area address register and first page address register for indicating whether or not said first page is available in said memory;

b. second means coupled to be responsive to said first means for converting said first area and first page address to a first segment number when said first page is available;

c. third means coupled to be responsive to said second means for converting said first segment number to an absolute address for locating said first page relative to said system base;

d. fourth means coupled to be responsive to said third means for locating within said first page a first indicator for determining the availability of said first of said database records associated with said first indicator; and,

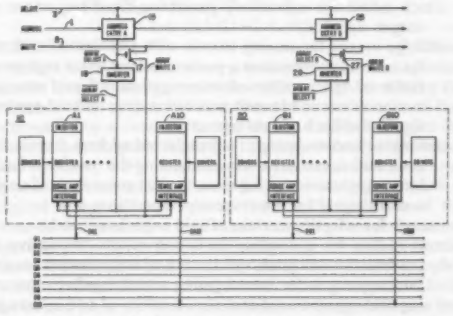
e. fifth means coupled to be responsive to said fourth means for loading said first area address, first page address and first line number into said first index register when said first of said database records is available.

4,024,509

CCD REGISTER ARRAY ADDRESSING SYSTEM INCLUDING APPARATUS FOR BY-PASSING SELECTED ARRAYS

Ben R. Elmer, Glendale, Ariz., assignor to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed June 30, 1975, Ser. No. 592,155
Int. Cl.³ G06F *13/00;* **G11C** *7/00, 19/00*
U.S. Cl. 340—172.5 **26 Claims**



1. An addressing system for *k* arrays of CCD registers

wherein at least a one of said register arrays can contain a fault condition, said system responsive to a serial address signal and control signals for selecting and enabling a one of said arrays not having a fault condition, said system comprising;

k storage means, each of said storage means being associated with a one of said *k* arrays, wherein each of said storage means can store a data signal

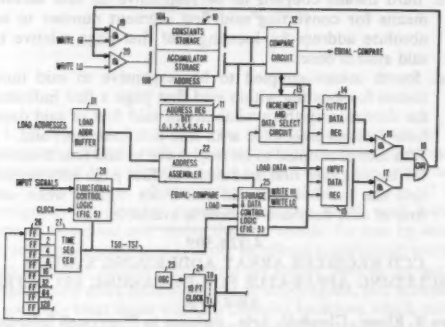
busing means serially coupling and applying said address signal to said *k* storage means, said busing means including means coupled to each of said storage means for electrically by-passing said coupled storage means; each of said electrically by-passing means being inactivated when no fault condition is present in said associated array, wherein storage means with no fault condition forms a shift register, said shift register receiving and storing a signal determined by said serial address signal; and

selection means coupled between each of said storage means and said associated register array, each of said selection means responsive to said stored data signal in said coupled storage means for generating a first array signal for enabling said coupled array.

4,024,510
FUNCTION MULTIPLEXER

Robert Charles Pearson, Newark Valley, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,411
Int. Cl.² G06F 9/00
U.S. Cl. 340—172.5 **10 Claims**



1. Apparatus for generating timed control signals for initiating each of a plurality of different operations comprising:

means for generating a control signal for initiating one of a plurality of operations;

clock means for repetitively generating fixed sequences of output signals;

storage means for storing therein at a preselected address for each said operation a predetermined value representative of the number of interrogations of said storage means to occur between successive ones of said control signals for each of said operations;

means for accumulating at a preselected address therein for each said operation a value indicating the number of said interrogations occurring since the last generation of a said control signal for the respective operation; and

means for selecting certain of said sequences; and

said means for generating including means responsive to predetermined signals within each of said selected ones of said sequences for interrogating and thereafter comparing said accumulated and stored values of said interrogations at corresponding ones of said addresses and issuing said control signal for said operations when said values are equal and for incrementing by one said accumulated value when said values are unequal.

4,024,511
MODIFIED BIPHASE MODULATION BAR CODE PRINTER

Robert B. McJohnson, Dallas, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Sept. 25, 1975, Ser. No. 616,879
Int. Cl.² G06F 1/00; G01D 15/18
U.S. Cl. 340—172.5 **6 Claims**

BIT BINS	0	1	2	3	4	5	6	7	8
BINARY DATA	1	0	0	1	1	1	0	1	0
BAR PATTERN	1			1	1	1		1	
VIDEO WAVEFORM									

1. A method of printing a binary information signal upon a document surface as a modified biphase modulated bar code, which comprises:

a. converting said binary information signal to a true biphase modulated digital signal wherein each binary bit is replaced by a logic level code occurring within a bit time period;

b. sensing a first logic level, and shifting to a next occurring logic level if a logic zero is detected or to a second occurring logic level if a logic one is detected;

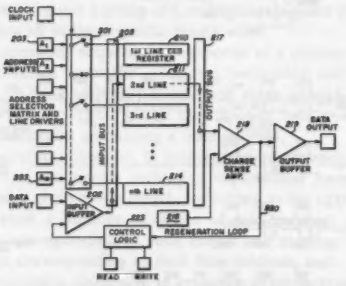
c. upon detecting a logic one in step (b), printing a bar in the bit time period half in which said first logic level appears;

d. repeating steps (b) and (c) until said true biphase modulated digital signal is entirely printed as a modified biphase modulated bar code.

4,024,512
LINE-ADDRESSABLE RANDOM-ACCESS MEMORY

Gilbert F. Amelio, Saratoga, and Kamleshwar C. Gunsagar, Campbell, both of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed June 16, 1975, Ser. No. 587,441
Int. Cl.² G11C 21/00, 7/00, 19/28
U.S. Cl. 340—173 RC **8 Claims**



1. A line-addressable random-access memory, comprising:

a plurality of lines of charge storage elements;

means for introducing charge representing binary information to the beginning of particular ones of said plurality of lines of charge storage elements which are addressed;

at least one data clock signal means to effect the transfer of charge along those lines of said charge storage elements which are addressed;

an address-selection matrix, including a plurality of line drivers corresponding on a one-to-one basis to said plurality of lines of charge storage elements, electrically coupled between said data clock signal means and said lines to permit the addressed ones of said lines to be clocked while the unaddressed lines are maintained in a definite state;

charge sensor means for receiving charge from said addressed lines and, in response thereto, generating a signal which represents the data signified by said charge; and

recirculation means for recirculating a refreshed representation of said charge from said charge sensor means to said means for introducing charge.

4,024,513

OPTICAL SYSTEM FOR THE STORAGE OF SELECTIVELY ERASABLE BINARY DATA ARRANGED IN THE FORM OF HOLOGRAPHICALLY RECORDED PAGES

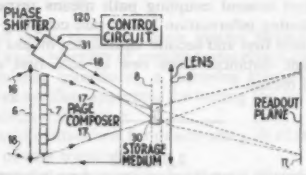
Jean-Pierre Huignard, and Francois Micheron, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed June 26, 1975, Ser. No. 590,824

Claims priority, application France, June 28, 1974, 74.22690

Int. Cl.² G03H *1/26, 1/14*

U.S. Cl. 340—173 LT 12 Claims



1. An optical storage system for selectively erasable binary data arranged in pages holographically recorded within a photosensitive medium, said system comprising: a source of coherent radiation, a photosensitive medium for storing said binary data, first optical means splitting said coherent radiation into an object beam and a reference beam, a page composer device optically modulating said object beam in accordance with said binary data, second optical means causing said modulated object beam and said reference beam to intersect one another for effecting selective holographic recording and erasing of said pages within at least one portion of said photosensitive medium, third optical means cooperating with said reference beam, for selectively reading out the elementary hologram photo-induced in said photosensitive medium, and optical phase-shift means acting upon the phase of one of said beams in order to introduce an optical phase-shift acquiring the respective values 0 and π for respectively effecting recording and erasing of said pages; said photosensitive medium being constituted by an electrically birefringent material undergoing a change in refractive index photo-induced by said coherent radiation; said photo-induced change in refractive index being caused by a reversible optical damage effect occuring in relation with a spatial variation in the amplitude of said coherent radiation.

4,024,514

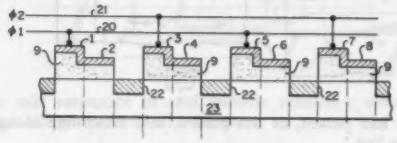
MULTIPHASE SERIES-PARALLEL-SERIES CHARGE-COUPLED DEVICE REGISTERS WITH SIMPLIFIED INPUT CLOCKING

Ben R. Elmer, Glendale; Wallace E. Tchon, and Anthony J. Denboer, both of Phoenix, all of Ariz., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed June 30, 1975, Ser. No. 591,724

Int. Cl.² G11C *11/44*

U.S. Cl. 340—173 CA 19 Claims



1. A charge-coupled device (CCD) shift register for storing bits of information in the form of packets of charge comprising:

a plurality of driver circuits including:

first and second driver circuits for generating a first and second pulse train respectively, said first and said second pulse trains being 180° out of phase, and other driver circuits for generating multiphase pulses; the sum of a first portion of said other pulses equalling said first pulse train and the sum of a second portion of said other pulses equalling said second pulse train;

input means responsive to said first and said second pulse trains for serially transferring said packets of charge through said input means;

output means responsive to said first and said second pulse trains for serially transferring said packets of charge through said output means; and

central storage means responsive to said other driver circuits for multiphase parallel transfer of a plurality of said packets of charge through said central storage means, said central storage means coupled to receive in parallel said plurality of said packets of charge from said input means and coupled to transmit in parallel said plurality of said packets of charge to said output means.

4,024,515

MAGNETO-INDUCTIVE READOUT OF CROSS-TIE WALL MEMORY SYSTEM USING BIPOLAR, ASYMMETRICAL, HARD AXIS DRIVE FIELDS AND LONG SENSE LINE

Ernest J. Torok, St. Paul, and David S. Lo, Burnsville, both of Minn., assignors to Sperry Rand Corporation, New York, N.Y.

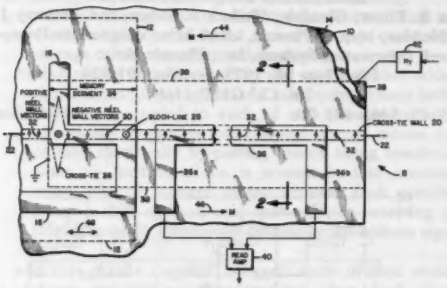
Filed Aug. 28, 1975, Ser. No. 608,815

Int. Cl.² G11C *11/02*

U.S. Cl. 340—174 TF 5 Claims

1. In a cross-tie wall memory system in which binary information is stored along a cross-tie wall in a magnetic film by the presence of or absence of a section of inverted Neel wall that is bounded by a cross-tie on one end and a Bloch-line on the other end, a magneto-inductive read apparatus for the detection of binary information that is stored in the cross-tie wall system characterized by a sense line whose longitudinal axis is aligned along and superposed the longitudinal axis of the cross-tie wall and drive field means coupling first and second, opposite polarity, asymmetrical easy axis drive fields in the plane of the film, which first easy and is drive field is coupled to said inverted Neel wall section for driving only the Bloch-line of said inverted Neel wall section and along said sense line and which second easy axis drive field is coupled to the length of the cross-tie wall that was traversed by said Bloch-line for

reversing the magnetization therein and including in the sense line an output signal that indicates that the first hard axis drive



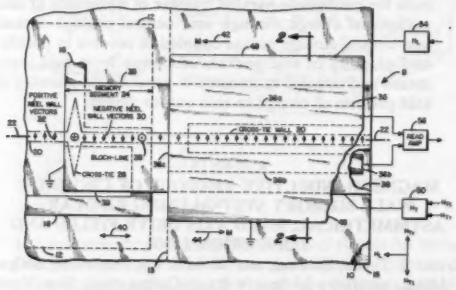
field had passed, or not passed, said Bloch-line along said sense line.

4,024,516

MAGNETO-INDUCTIVE READOUT OF CROSS-TIE WALL MEMORY SYSTEM USING EASY AXIS DRIVE FIELD AND SLOTTED SENSE LINE

Ernest J. Torok, St. Paul, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,816
Int. Cl.² G11C *11/02*
U.S. Cl. 340—174 TF **5 Claims**



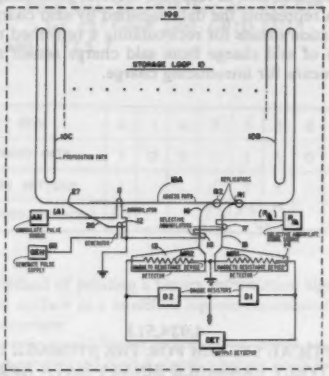
1. In a cross-tie wall memory system in which binary information is stored along a cross-tie wall in a magnetic film by the presence of or absence of a section of inverted Neel wall that is bounded by a cross-tie on one end and a Bloch-line on the other end, a magneto-inductive read apparatus for the detection of binary information that is stored in the cross-tie wall system characterized by a slotted sense line whose slot is aligned along and astraddled the longitudinal axis of the cross-tie wall and drive field means coupling first and second, hard and easy axis drive fields in the plane of the film, which first hard axis drive field is coupled to said inverted Neel wall section for driving only the Bloch-line of said inverted Neel wall section into and along said slot and which second easy axis drive field is coupled to the length of the cross-tie wall that was traversed by said Bloch-line for affecting but not reversing the magnetization therein and inducing in the sense line an output signal that indicates that the first hard axis drive field had passed, or not passed, said Bloch-line through the slot of the sense line.

4,024,517

CONTINUOUS DATA STREAM FIFO MAGNETIC BUBBLE DOMAIN SHIFT REGISTER

Thomas T. Chen, Yorba Linda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 31, 1975, Ser. No. 627,737
Int. Cl.² G11C *11/02*
U.S. Cl. 340—174 TF **13 Claims**



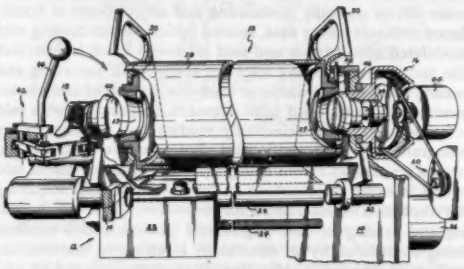
1. In combination
means for propagating information bits in the form of magnetic bubble domains through an information channel,
first and second switch means for transferring information bits out of said information channel,
detector means,
first and second coupling path means arranged respectively between said first and second switch means and said detector means, and
first and second annihilator means arranged adjacent to said first and second coupling path means respectively for annihilating information bits in said coupling paths,
each of said first and second annihilator means arranged at different distances from one of said first and second switch means.

4,024,518

METHOD AND APPARATUS FOR POSITION REFERENCING THE ROTATING DRUM OF A SCANNER/PLOTTER

William Thomas Boston, Melrose, Mass., assignor to Optronics International, Inc., Chelmsford, Mass.

Filed Nov. 14, 1975, Ser. No. 632,166
Int. Cl.² G08C *19/16*
U.S. Cl. 340—206 **6 Claims**



1. Apparatus for position referencing a rotating drum having thereon a fiducial, said apparatus comprising:
1. drive means for rotating the drum about a rotational axis;
2. means for generating a rotational reference signal at a

predetermined rotational point about said axis of rotation;

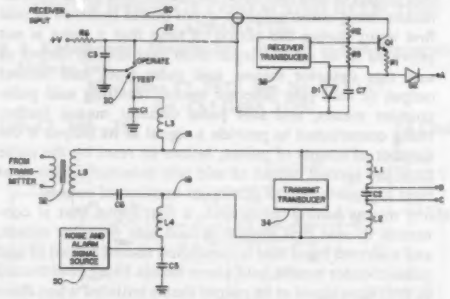
3. means for generating a plurality of rotational position signals representing a corresponding plurality of predetermined, rotationally spaced points about said axis of rotation;
4. means positioned at a predetermined rotational point about said axis of rotation for detecting the presence of said drum fiducial at said point and for producing an output signal in response thereto; and
5. means responsive to said reference signal, position signals and said output signal for producing a drum true position signal.

4,024,519

INTRUSION ALARM TEST SYSTEM

Aaron A. Galvin, Lexington, and James B. Edson, Concord, both of Mass., assignors to American District Telegraph Company, New York, N.Y.

Filed Oct. 6, 1975, Ser. No. 620,041
Int. Cl.² G08B *29/00*
U.S. Cl. 340—214 **11 Claims**



1. For use in an intrusion alarm system having a central control unit and a plurality of remote transceivers each including a transmitting transducer, a receiving transducer and a receiving preamplifier, apparatus for testing the operability of said transceivers comprising:

means at said control unit for deactivating all of said preamplifiers of said transceivers;

means located at and associated with each of said transceivers for allowing reactivation of the preamplifier of only the associated transceiver; and

means selectively connectable to any one of said transceivers for reactivating upon connection to a transceiver the corresponding preamplifier thereof and for monitoring the noise and alarm levels of said reactivated transceiver.

4,024,520

ELECTRICAL LATCHING CIRCUIT

Floyd M. Minks, Rte. 1, Box 66, Kissimmee, Fla.

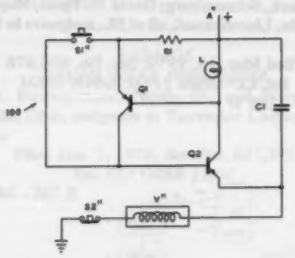
Filed Nov. 25, 1975, Ser. No. 635,180
Int. Cl.² G08B *21/00*
U.S. Cl. 340—239 R **16 Claims**

1. An electrical latching circuit, relatively impervious to noise pulses, for being used with a source of electrical power for supplying a current flow through a circuit line to an electrical load, said circuit comprising:

a variable resistance element interposed in series with the electrical load along said circuit line, said variable resistane element having a resistance that increases as the temperature increases;

circuit means coupled to and for varying the resistance of said variable resistance element; and

control means interposed in series with said variable resistance element and the electrical load along said circuit line for conducting current therethrough responsive only



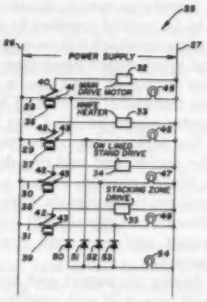
to said resistance of said variable resistance element exceeding a predetermined value.

4,024,521

ALARM INDICATOR CIRCUIT USING INDICATOR LAMPS

Donald Salk, Cranston, R.I., assignor to Sheldahl, Inc., Northfield, Minn.

Filed Aug. 20, 1975, Ser. No. 606,309
Int. Cl.² G08B *23/00*
U.S. Cl. 340—253 B **3 Claims**



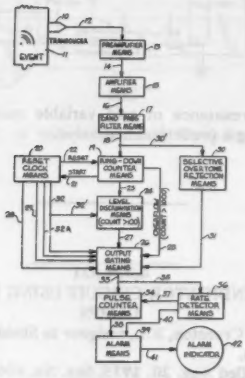
1. In combination, electrically energized apparatus having a plurality of operational drive means functioning from a single common source of electrical power, an alarm indicator system having a plurality of condition responsive control switch means, each switch means having a normally open and a normally closed contact and coupled for controlling the delivery of current to said drive means through said normally open contacts and to said indicator lamps through said normally closed contacts for visually indicating a condition when said control switch means are coupled across said normally closed contacts, said combination including:

a. master alarm lamp means in parallel circuit arrangement with each of said indicator lamps and including a plurality of unidirectional conducting means, one of said unidirectional conducting means being interposed in series between said master alarm lamp and each of said normally closed contacts, each of said unidirectional conducting means being uniformly poled with respecct to said source of electrical power and with respect to each other to facilitate conduction in the same direction of current flow to effectively electrically couple each of said indicator lamps to said master alarm lamp, while electrically isolating each of said indicator lamps, one from the other.

4,024,522
ACOUSTIC EMISSION SYSTEM FOR WELDING FLAW DETECTION

Robert N. Clark, Schaumburg; David W. Prine, Maywood, and Fay K. Chin, Lincolnwood, all of Ill., assignors to Gard, Inc., Niles, Ill.

Filed Mar. 15, 1976, Ser. No. 666,678
Int. Cl.² G08B 21/00; G01N 29/04
U.S. Cl. 340—248 W 12 Claims



1. An acoustic emission system for welding flaw detection using a receiver transducer means, mounted in use on one of the two articles to be welded together to receive an acoustic burst from the article on which it is mounted and to provide at its output a signal burst, which comprises:

amplifier means having an input that is connectable to the output of the transducer means and having an output;

ring-down counter means having a first input and a second input, said first input being connected to said output of said amplifier means, and said ring-down counter means including a binary counter having a first output and a second output providing signals when the decimal count of the amplitudes of a signal burst exceeds a first predetermined count and a second predetermined higher count, respectively;

clock means having an output and an input that is connected to said output of said amplifier means, said clock means being constructed to initiate its timing operation in response to said first signal of the signal burst from said amplifier means and that, after a predetermined period of time of operation, provides a resetting of said clock means to be able to start another timing operation for the predetermined period of time when initiated again by said first signal of the next signal burst and provides a pulse at its output, and said output being connected to said second input of said ring-down counter means to provide a reset of its counter by the pulse from said output;

level discrimination means having an output, a first input that is connected to said first output of said counter of said ring-down counter means, and a second input that is connected to said output of said clock means, said level discrimination means being constructed to provide a signal at its output when it receives a pulse from said clock means if said level discrimination means receives a signal from said first output of said counter of said ring-down counter means that is provided when the decimal count is said counter has exceeded the first predetermined count;

output gating means having an output, a first input connected to said output of said level discrimination means, a second input connected to said second output of said counter of said ring-down counter means, and a third input connected to said output of said clock means, said output gating means being constructed to provide a pulse, based on the pulse from said clock means to said output gating means, if the said output gating means is provided a signal from said level discrimination means and if said second output of said counter of said ring-down counter means does not provide the signal that is provided when the decimal count in said counter has exceeded the second predetermined count;

rate detector means having an input and first and second outputs, said rate detector means being constructed to provide a signal at its first output in response to a pulse at its input that continues only if each subsequent pulses are each received at said input of said rate detector means within a predetermined period of time subsequent to the preceding pulse from said output gating means and to provide a pulse at the second output of said rate detector means after the signal at said first output of said rate detector means;

pulse counter means having an output and a first input connected to said output of said output gating means to receive each pulse provided at said output of said output gating means, and a second input connected to said second output of said rate detector means, said pulse counter means being constructed to count pulses received at said first input during the period of time that a pulse is not provided to its second input from said second output of said rate detector means, said pulse from said second output of said rate detector means resetting said pulse counter means, and said pulse counter means further being constructed to provide a signal at its output if the number of counts of pulses, before its reset by the pulse from the second output of said rate detector means, is at least a predetermined minimum number of counts;

alarm means having an output, a first input that is connected to said first output of said rate detector means, and a second input that is connected to said output of said pulse counter means, said alarm means being constructed to provide a signal at its output that is initiated when there is a signal at its second input and that ceases when there is a signal at its first input; and

alarm indicator means having an input connected to said output of said alarm means and being operative in response to said signal provided by the said alarm means to indicate a weld flaw.

4,024,523
BATTERY CONDITION MONITORING METHOD AND APPARATUS

John B. Arnold, Seville; John M. Bowyer, Copley; Howard R. Hegbar, and Archie B. Shaefer, both of Akron, all of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Oct. 14, 1975, Ser. No. 622,201
Int. Cl.² G08B 21/00
U.S. Cl. 340—249 13 Claims

1. A battery condition monitoring device for testing a rechargeable battery, comprising:

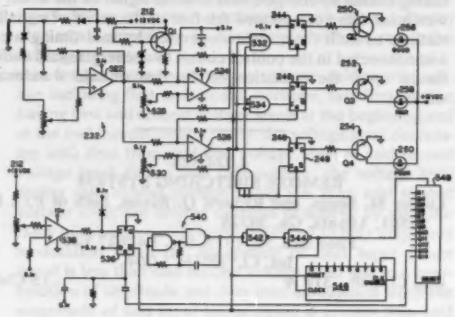
an external load engageable with a battery;

a function generator connected to the battery and producing an output signal as a function of the terminal voltage of the battery immediately upon engagement of the load;

a timing circuit connected to the battery for establishing a test time period;

comparison means connected to said function generator for comparing the value of said function at the end of said test time period with preselected voltage references, the

comparisons determining the condition of said battery; and

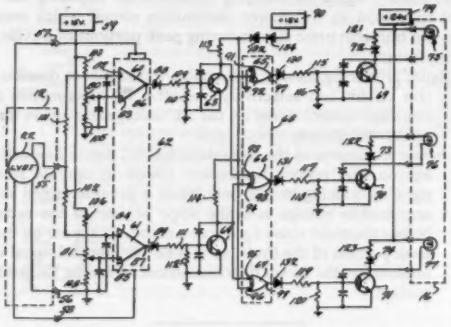


display means connected to said comparison means for indicating the condition of said battery.

4,024,524
SINGLE WEB EDGE CONTACTING DETECTING APPARATUS

J. A. Kwiatkowski, Muncie, Ind., assignor to Ball Corporation, Muncie, Ind.

Filed June 17, 1975, Ser. No. 587,667
Int. Cl.² G08B 21/00
U.S. Cl. 340—259 14 Claims



1. Apparatus for sensing and indicating the edge position of a web, having a pair of side edges, being fed in a path of movement in a given direction to a machine for acting on said web, said apparatus comprising:

means for continuously physically contacting a single side edge of said web to sense the physical position of said single edge relative to a reference point that is stationary with respect to said machine,

means for transforming said physical position sensing of said single web edge to a direct current electrical signal of a given voltage, the voltage of said signal being dependent upon the relative position of said single edge to said stationary reference point, each relative position of said single web edge having a signal of a different voltage associated therewith,

means for comparing the given voltage of said electrical signal to a reference direct current voltage,

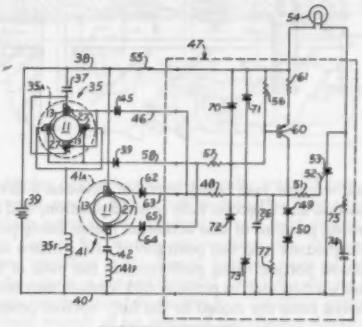
three visual indicating means, each for visually indicating the position of said web edge relative to said stationary reference point when said edge is within a given distance range from said stationary reference point, and

means for selectively energizing one of said three visual indicating means dependent upon the given voltage of said electrical signal relative to said reference voltage, said means comprising a pair of switching amplifiers, a triple exclusive OR gate having inputs and an output for each gate thereof, each gate input being operatively associated with said switching amplifiers, and a transistor connected in series with each gate output of said triple exclusive OR gate.

4,024,525
BRUSH WEAR INDICATOR

Kenneth A. Baumgartner, Peoria, Ill., and Ward L. Bivens, Painesville, Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed Jan. 7, 1976, Ser. No. 647,295
Int. Cl.² G08B 21/00
U.S. Cl. 340—267 R 17 Claims



1. In a brush wear indicator for a direct current machine having a rotating commutator, a yoke surrounding said commutator, a brush holder on said yoke and a carbon brush means mounted in said brush holder for translatory movement relative to said commutator, said brush means having a contact face spring-pressed against said commutator, the improvement comprising:

said carbon brush means having an elongated groove formed in one side thereof, said groove having opposed sides and a bottom, said groove having a terminating end spaced from the end of said brush means away from said contact face, said groove extending from said terminating end towards said contact face;

an electrically conductive probe mounted in fixed relation to said yoke and said brush holder and having an end portion extending into said groove, said end portion of said probe being spaced from the sides and bottom of said groove during translatory movement of said brush means but being engageable with said terminating end of said groove.

4,024,526
ALARM DEVICE FOR USE IN COMBINATION WITH WINDOW SASH

Joseph Banner, 400 Glenway Road, Erdenheim, Pa. 19118

Filed May 19, 1976, Ser. No. 687,718
Int. Cl.² G08B 13/06
U.S. Cl. 340—274 R 10 Claims

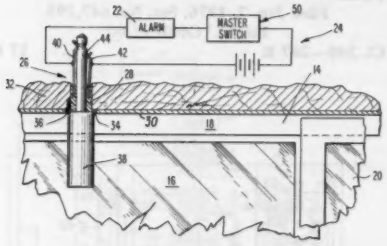
1. An alarm device for use in combination with a window sash to prevent the window from being opened more than a predetermined distance without actuating the alarm, while permitting it to be opened at least a predetermined distance without actuating the alarm, comprising:

a. alarm means capable of actuation in response to selected predetermined electrical conditions;

b. circuit means comprising a circuit electrically connected to said alarm means and coacting therewith to provide said electrical conditions upon appropriate actuation;

c. actuation means electrically interconnected with said circuit means and coacting therewith for electrically actuating said alarm means through said circuit, compris-

ing: a first portion normally engaged with said circuit means; and a second portion adapted to be releaseably retained by said first portion and coacting with said first portion in the retained condition to complete the circuit and provide an electrical condition which prevents actuation of the alarm, and coacting with said first portion in a removed condition to break said circuit and thereby provide an electrical condition which actuates said alarm means;

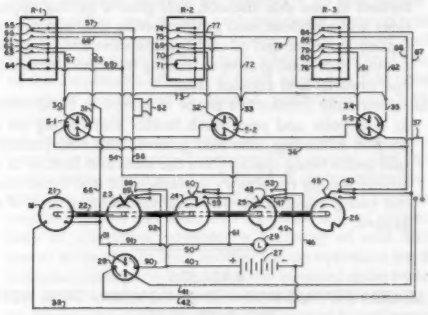


d. said window sash being movable between a first closed position and a second fully opened position, said first and second portions of said actuation means being positioned intermediate said two positions of said window sash; said second portion being positioned in the path of travel of said window sash to prevent said window sash from being moved from the closed to the fully opened position.

4,024,527
DELAYED SIGNAL WATCHMAN'S TOUR SUPERVISORY SYSTEM

Frank W. Houghton, 1000 Tarpon Center Drive, Venice, Fla. 33595

Filed June 27, 1975, Ser. No. 591,169
Int. Cl.² G08B 25/00
U.S. Cl. 340—306 **8 Claims**

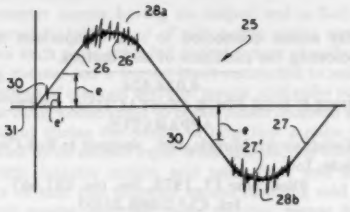


1. A delayed signal watchman's tour supervisory system including a plurality of spaced watchman's station each embodying a switch, a plurality of relays each connected to be operated by the operation of one of said switches, contacts on said relays for connecting the switches in the watchman's stations in sequence, a switch connected to a power source for supplying energizing power to the watchman's stations and relays means connected to said energizing switch and a monitoring station whereby upon initial operation of the energizing switch a signal in the monitoring station will be energized to indicate that the watchman is at his post, a visible signal connected to said power controlling switch and energized when the power controlling switch is turned on, timing means connected in the circuit to said visible signal to control each time period of energization of the visible signal to indicate to the watchman that he has a limited time period before operating the first of said signalling stations, an audible signal connected on the circuit to said visible signal, and means actuated by said timing means to energize said audible signal in the event the watchman has not operated the first of the series of signalling stations at such time, means operated by said timing means and connected in the control circuit to deenergize said audible means upon the operation of the first of said watchman's stations.

4,024,528
REMOTE SWITCHING SYSTEM

Luther M. Boggs, and Richard Q. Boyles, both of P.O. Box 28501, Atlanta, Ga. 30328

Filed Oct. 30, 1975, Ser. No. 627,144
Int. Cl.² H04M 11/04
U.S. Cl. 340—310 A **15 Claims**



5. Control signal transmitting apparatus for imposing control signals on an AC power distribution circuit which may contain transient noise signals during peak portions of a cycle, comprising:

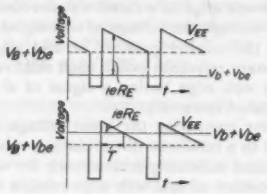
signal producing means connectable to the power distribution circuit and selectively operative to superimpose a transient control signal on the AC voltage present in the power distribution circuit; and

means responsive to the instantaneous AC power line voltage on said power distribution circuit to operate said signal producing means only when a predetermined instantaneous voltage is in the slope portion of the cycle before transient noise signals commence to appear on the peak portion of the cycle, so that no said control signal is imposed on the power distribution circuit during the peak portion.

4,024,529
IMAGE DISPLAY DEVICE

Tetsuo Sakai, Tokyo, Japan, assignor to Nippon Hoso Kyokai, Tokyo, Japan

Filed June 11, 1974, Ser. No. 478,272
Int. Cl.² H01J 17/48
U.S. Cl. 340—324 M **10 Claims**



1. A DC image device comprising:

a plurality of driving circuits each having a modulation signal input terminal for receiving an input signal and a source input terminal for receiving a source voltage, each

of said driving circuits producing a driving current in response to said input image signal;

a plurality of display elements arranged in the form of a matrix for receiving said driving currents from said plurality of driving circuits, respectively, each of said display elements luminescing in accordance with its respective driving current; and

means for generating said source voltage, said source voltage including first and second portions, said first portion having first and second voltage levels at the beginning and at the end thereof, respectively, the voltage level decreasing with time from said first voltage level to said second voltage level during said first portion, the voltage level during said second portion being less than said second voltage level; the driving currents produced by said plurality of driving circuits being subjected to only amplitude modulation when the magnitude of said input image signal is less than said second voltage level and to a combination of amplitude and duty time modulation when the magnitude of said input image signal is greater than said second voltage level and less than said first voltage level.

4,024,530

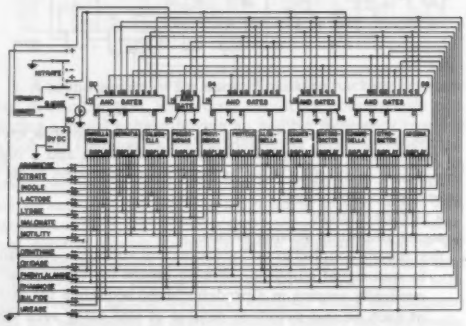
BACTERIA IDENTIFICATION DEVICE

Arleigh Bruce Hughes, 158 Haulani St., Pukalani, Hawaii

Filed Dec. 23, 1975, Ser. No. 643,852

Int. Cl.² G08B *5/36*

U.S. Cl. 340—332 **4 Claims**



1. A device for evaluating a first plurality of test results obtained by testing a test sample to determine into which of a second plurality of categories the test sample should be classified, comprising:

A. a first plurality of manually operated electrical switch means for entering the first plurality of test results into the device as switch positions,

B. a second plurality of sets of lamps, each set of lamps corresponding to a respective one of the second plurality of categories,

C. first logic means responsive to the respective switch positions for controlling the lighting of individual lamps in respective sets of lamps for which the results of the respective test corresponding to the respective switch has a significant positive correlation with the respective category corresponding to the respective set of lamps, and

D. second logic means responsive to the respective switch positions and operative to enable or disable the lighting of all of the lamps in respective sets of lamps,

whereby a given lamp is lighted if and only if the second logic means causes the set of lamps containing the given lamp to be enabled to be lighted and the first logic means causes the given lamp within an enabled set to be lighted.

4,024,531

DISPLAY DEVICES

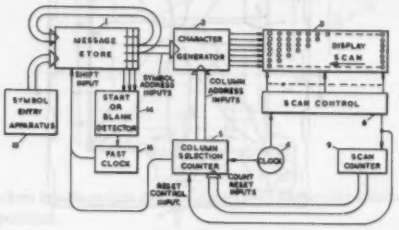
Rodney Roberts Rayner Ashby, Bournemouth, England, assignor to National Research Development Corporation, London, England

Filed Mar. 3, 1975, Ser. No. 554,826

Claims priority, application United Kingdom, Mar. 5, 1974, 9942/74

Int. Cl.² G08B *5/36*

U.S. Cl. 340—334 **2 Claims**



1. A display device including a regular array of light souces, scan control means connected to scan the light sources by sequentially priming the columns of said light souces, a first memory circuit for storing appropriate sets of signals for displaying specified dot columns forming parts of predetermined characters, a second memory circuit for storing character signals representing characters in a sequence corresponding to their receipt at an input of the display device, and a computer programmed to select signals from the second memory circuit in the sequence in which they are stored, to derive the addresses in the first memory circuit from the selected signals of dot column signals specifying columns to be displayed of the characters represented by the selected signals, and to apply the dot column signals to the display in synchronism with the operations of said scan control means in such a way that the displayed dot column signals are shifted by one column in the array on each successive scan of the array.

4,024,532

CHARACTER MODULE FOR AUTOMATIC SIGN

Richard N. Sherwin, Rockford Bay, Coeur d'Alene, Idaho 83814

Filed Feb. 5, 1973, Ser. No. 329,405

Int. Cl.² G09B *13/00;* **H05B** *39/00, 41/00*

U.S. Cl. 340—336 **4 Claims**

1. An automatic sign character module, comprising, in combination:

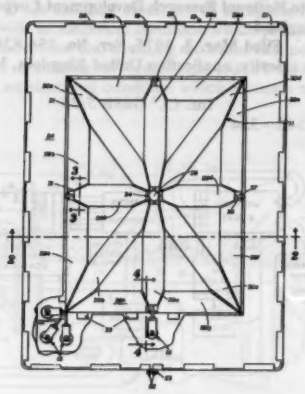
a rectilinear casement having a transparent face and defining a rectilinear chamber;

character module mounted in the chamber, having 16 elongate flat module elements arrayed with eight elements forming the periphery of a square, four elements forming a superimposed vertical cross and four elements forming a diagonal cross, with no element extending beyond the joinder with an adjacent element, each element having truncated ends to allow rotation relative to adjacent elements without interference and each element having a contrasting colored reflective face with a background colored obverse;

each element carried by an elongate mounting rod extending beyond the character elements, the ends of the mounting rods being journaled in spaced planes so as to allow pivotability of associated elements; and

independently controllable means associated with each element to pivot the element to present the face or obverse side facing the casement face, comprising a plurality of bi-directional electric motors having a coil reversable by electric charge with paired opposed outwardly extending pole pieces, and;

a permanent magnet, movable in the field between the two extended pole pieces carried by one end part of each



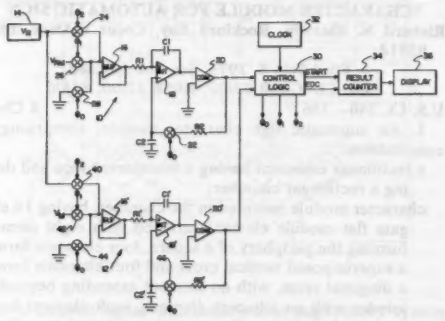
mounting rod, to pivot that rod in response to charged coil polarity.

4,024,533

RATIOMETRIC ANALOG-TO-DIGITAL CONVERTER

Leopold Neumann, Lexington, Mass., assignor to Analogic Corporation, Wakefield, Mass.

Filed July 10, 1975, Ser. No. 594,758
Int. Cl.² H03K *13/20*
U.S. Cl. 340—347 NT 13 Claims



1. An analog-to-digital converter comprising:

a first analog signal to time interval converter circuit operative during a first time interval to provide a signal representative of the magnitude of a reference signal and operative during a second time interval to provide a signal of a duration representative of the value of a first input signal;

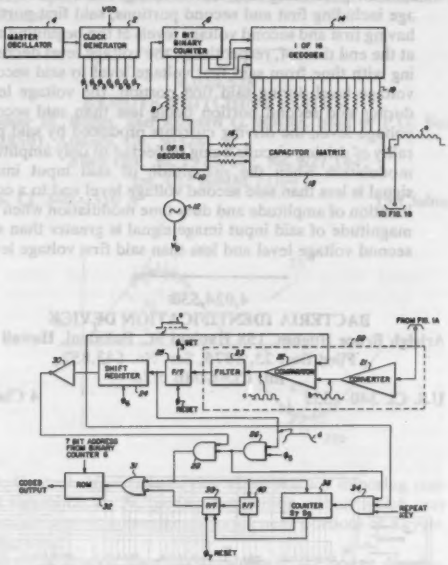
a second analog signal to time interval converter circuit operative during said second time interval to provide a signal representative of the value of a second input signal and operative during a third time interval to provide a time interval of a duration representative of the ratio of said first and second input signals.

4,024,534

KEYBOARD ENCODING WITH REPEAT KEY PAUSE

Wilbur E. DuVall, Victorville, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 24, 1975, Ser. No. 634,970
Int. Cl.² G08C *1/00*
U.S. Cl. 340—365 S 1 Claim



1. A system for encoding an array of switching devices, each of which has a low impedance in a closed state and a high impedance in an open state, at least one of said keys being a repeat key, comprising:

a voltage source,

signal amplitude sensing means,

first means coupled to said array, to said voltage source, and to said signal amplitude sensing means for continuously cyclically sensing in a predetermined sequence the state of each of said switching devices of said array such that each of said switching devices of said array is coupled to said voltage source and said signal amplitude sensing means, whereby a signal of one amplitude is supplied to said signal amplitude sensing means when a closed switching device is coupled to said voltage source and said signal amplitude sensing means and a signal of a different amplitude is supplied to said signal amplitude sensing means when an open switching device is coupled to said voltage source and said signal amplitude sensing means,

said signal amplitude sensing means providing an output signal of a high value when the input signal supplied thereto is above a certain amplitude, said output signal providing a first encoding signal,

storage means coupled to said signal amplitude sensing means for storing the state of each of said switching devices during the previous scanned sequence,

a multi-stage counter coupled to the outputs of said signal amplitude sensing means and said storage means, said counter incrementing when the output of said signal amplitude sensing means is high, the inverted output of said storage means is high, and the key being sensed is a repeat key, and

first and second switching devices, said first switching device being coupled to a first stage of said counter, said second switching device being coupled to a second,

higher order stage of said counter and to said first switching device,

said first switching device being rendered conductive only after said second switching device is rendered conductive to provide a pause in the repeat key function encoding.

4,024,535

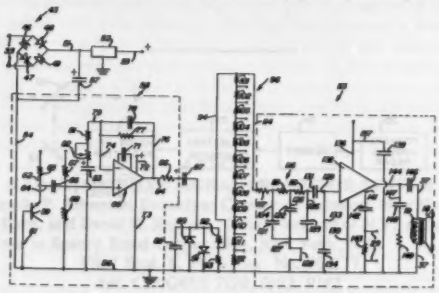
SOUND GENERATING SYSTEM FOR A SOUND MASKING PACKAGE

Harold Goldstein, Westbury, N.Y., assignor to Acoustical Design Incorporated, Morristown, N.J.

Filed June 28, 1976, Ser. No. 700,596

Int. Cl.² H04R 3/00

U.S. Cl. 340—384 E **10 Claims**



1. A sound generator for a sound masking package comprising, in combination, an electric circuit for continuously producing a signal voltage having an audible frequency range in which the frequencies are established at predetermined relative decibel levels, means for connecting said circuit to an associated source of electric power, a transducer for producing an audio output signal corresponding to said signal voltage, means for applying said signal voltage to said transducer, said electric circuit including noise generating means for producing an output noise signal means for converting said output noise into said signal voltage to produce a signal voltage having an audible frequency range in which the frequencies are established at predetermined relative decibel levels, and means for amplifying said signal voltage to produce an audio output signal from said transducer at a selected decibel level.

4,024,536

METHOD AND A DEVICE FOR CHARACTER PRESENTATION

Leif Georg Lennart Andersson, Henriksbergsvagen 104, Hunden, Stockholm, Sweden (S-136 67)

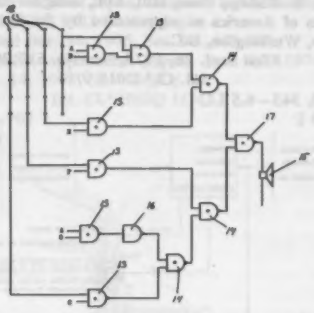
Filed Sept. 16, 1975, Ser. No. 613,735

Claims priority, application Sweden, Sept. 20, 1974, 7411842

Int. Cl.² G08B 3/00

U.S. Cl. 340—407 **10 Claims**

1. A method of non-visual presentation of digits, letters or other characters comprising the steps of generating a number of signals for each character, said signals representing the character in a special code; transferring each signal to a manually operable touch-point means; operating the touch-points of said touch-point means in a predetermined sequence to derive successive responses for the operated touch-points; and in accordance with the responses, deriving non-visual output signals which can be perceived by a human, so that an output signal combination identifying a particular character is generated when touch-points pertaining to said particular character are operated.



4,024,537

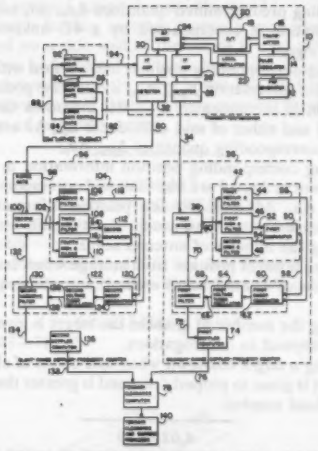
DOPPLER-RADAR, PROJECTED TERRAIN-CLEARANCE SYSTEM

Gerald E. Hart, P.O. Box 127 LOW, Locust Grove, Va. 22508

Filed May 24, 1976, Ser. No. 689,694

Int. Cl.³ G01S 9/22

U.S. Cl. 343—5 R **10 Claims**



1. A pulsed doppler-radar system, including a doppler-radar transmitter/receiver, for computing terrain clearance of the projected flight path of an aircraft comprising:

maximum-range doppler-frequency counter means receiving an output from said transmitter/receiver for counting the highest doppler frequency for a maximum range;

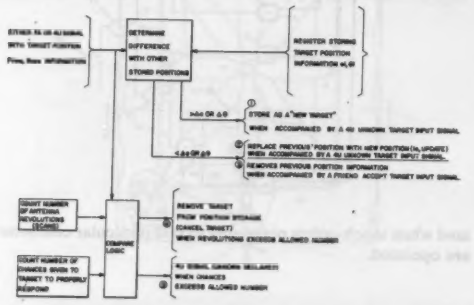
slant-range doppler-frequency counter means receiving an output from said transmitter/receiver for counting the highest doppler frequency for a known slant-range;

terrain-clearance computer means, receiving the outputs of said maximum-range doppler-frequency counter means and said slant-range doppler-frequency counter means, for computing a depression angle and terrain clearance information.

4,024,538
ELECTRONIC FILE AND RECORD KEEPER FOR SECONDARY RADAR TARGETS

Walton B. Bishop, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 26, 1975, Ser. No. 617,269
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 LC 2 Claims



1. A method for maintaining IFF target position information and for providing target status information regarding new target position information ρ_{new}, θ_{new} and previously stored position information ρ_i, θ_i received in a scanning antenna system, and for providing a target status indication comprising the steps:

comparing ρ_{new}, θ_{new} with each ρ_i, θ_i previously stored, forming a difference quantity $\Delta\rho = \rho_{new} - \rho_i$;

forming a difference quantity $\Delta\theta = \theta_{new} - \theta_i$;

storing ρ_{new}, θ_{new} as a new target if the difference quantity $\Delta\rho$ or the difference quantity $\Delta\theta$, is greater than corresponding predetermined quantities $\Delta\rho_o$, $\Delta\theta_o$ and the new information is accompanied by a 4U unknown target input signal;

replacing corresponding position information with updated position information ρ_{new}, θ_{new} if said new position information is accompanied by a 4U unknown target input signal and either of said differences $\Delta\rho$, $\Delta\theta$ are less than said corresponding quantities $\Delta\rho_o$, $\Delta\theta_o$;

removing corresponding position information ρ_i θ_i if said differences $\Delta\rho$, $\Delta\theta$ are less than said corresponding quantities $\Delta\rho_o$, $\Delta\theta_o$ and said new position information is accompanied by a friend accept input signal;

counting the number of antenna scans;

removing a target position from storage when said counted number of antenna scans exceeds a predetermined number;

counting the number of chances the target is given to properly respond to interrogations;

declaring a target unknown when said count of chances the target is given to properly respond is greater than a predetermined number.

4,024,539
METHOD AND APPARATUS FOR FLIGHT PATH CONTROL

Richard P. Quinlivan, Binghamton, and Harry H. Westerholt, Vestal, both of N.Y., assignors to General Electric Company, Binghamton, N.Y.

Filed Apr. 15, 1966, Ser. No. 448,373
Int. Cl.² G01S 9/02
U.S. Cl. 343—11 R 3 Claims

2. Apparatus for assisting manual path following control of an aircraft in a terrain following mode comprising:

a. terrain profile sensing means including airborne forward scanning radar means for generating reference path signals representative of the elevations of the undulating terrain along the azimuth of flight;

b. flight path trajectory generating means for converting said reference path signals to flight signals representative of a desired flight path at a predetermined terrain following elevation above said terrain including,

i. signal storage means for storing and repeating said reference path signals,

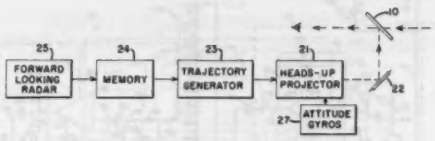
ii. sequential sampling means for reading said reference path signals at preset intervals representing constant increments of distance along said azimuth of flight in order reversed from the direction of flight,

iii. signal modifying means responsive to said sampling means to modify said reference path signals as read to flight path signals representative of said desired flight path of predetermined terrain-following mode offset from said terrain,

c. electronic display means for displaying a visual representation of said flight path signals including,

i. a cathode ray oscilloscope,

ii. perspective circuit means interconnecting said flight path trajectory generating means and said oscilloscope



for converting said flight path signals to a visual graphic line on said oscilloscope representing said desired flight path projected on a vertical plane offset a predetermined distance from said flight path and for adding a modulating signal of high frequency oscillation to cause said visual line to become a vertical band image with height indicating permissible deviation from exact flight path, said perspective circuit means being responsive to said sensing means to cause said band image to decrease in height and converge toward center inversely proportional to the range so as to indicate perspective,

iii. a heads-up display,

iv. optical means projecting said band image from said oscilloscope onto said heads-up display as a side boundary fence in registry with terrain features and indicating the desired avenue of flight whereby the desired flight path is indicated as an airspace defined by said boundary fence.

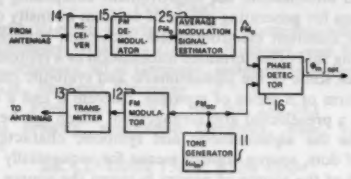
4,024,540
CONTINUOUS WAVE FM TONE RANGING RADAR WITH PREDETECTION AVERAGING

Mats Jorgen Ofverberg, Sunnyvale, Calif., assignor to Cincinnati Electronics Corporation, Cincinnati, Ohio

Filed Mar. 12, 1976, Ser. No. 666,526
Int. Cl.² G01S 9/24
U.S. Cl. 343—14 10 Claims

1. A CW FM TR radar receiver responsive to a local tone modulation source and a return signal having a carrier frequency modulated by the tone comprising an FM demodulator responsive to the return signal for deriving a demodulated signal containing the tone frequency as a component thereof,

means for averaging the phase of the tone frequency component of the demodulated signal, and means for comparing the



averaged phase of the tone frequency component and the phase of the tone of the local modulation source.

4,024,541

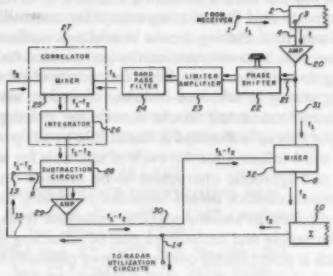
RADAR ADAPTIVE SIGNAL PROCESSOR SYSTEM

Angelo P. Albanese, Brooklyn; Chester A. Palmieri, New Hyde Park, and David H. Rattiner, Great Neck, all of N.Y., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 8, 1970, Ser. No. 70,277

Int. Cl.² G01S 7/28, 9/02, 9/42

U.S. Cl. 343—17.1 R 9 Claims



1. Apparatus for improving the signal-to-interference characteristic of a composite signal comprising a pulse signal in the presence of an extended interference signal, said apparatus comprising:

first multiplier-mixer means having first and second input means and output means,

first circuit means for supplying said composite signal to said first input means of said first mixer-multiplier means,

second circuit means for receiving said composite signal and for supplying an output to said second input means of said first multiplier-mixer means,

said second circuit means comprising in series relation:

limiter-amplifier means,

band pass filter means,

correlator means having first and second input means and output means, and

circuit means for applying an output of said correltor output means to said second input means of said first multiplier-mixer means,

circuit feed back means for applying an output of said first mixer-multiplier means to said second input means of said correlator means, and

output means coupled to said circuit feed back means.

4,024,542

ANTENNA MOUNT FOR RECEIVER CABINET

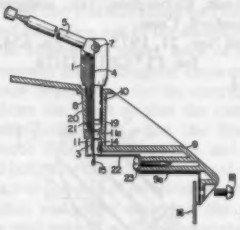
Junzo Ikawa, Chigasaki; Tokuji Aramaki, and Yasuo Naitoh, both of Fujisawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 24, 1975, Ser. No. 644,331

Claims priority, application Japan, Dec. 25, 1974, 49-3385[U]; Jan. 14, 1975, 50-6706[U]

Int. Cl.² H01Q 1/24

U.S. Cl. 343—702 2 Claims



1. An antenna apparatus for mounting on a cabinet having a recess therein comprising:

a. an antenna body including

a resin cover having a through-hole extending in an axial direction therethrough, said resin cover having a groove formed on the periphery thereof,

a plug pin fixed at one open end of said resin cover,

an antenna supporting member fixed at the other open end of said resin cover,

an antenna pipe pivotably mounted to said antenna supporting member, and

an elastic conductor disposed between said plug pin and said antenna supporting member, and

b. an elastic holding member having a projection thereon formed on a side wall of the recess in said cabinet, said antenna body being rotatably held within said cabinet upon insertion of said resin cover into said recess, the projection on said elastic holding member fitting into the groove of said resin cover.

4,024,543

PARABOLIC ANTENNA

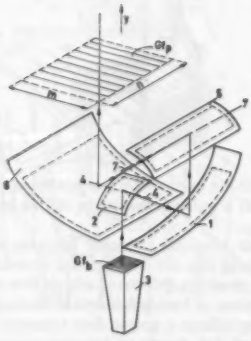
Vaclav Josef Vokurka, 18, Van Hallstraat, Son en Breugel, Netherlands

Filed July 23, 1976, Ser. No. 708,177

Claims priority, application Netherlands, Aug. 20, 1975, 7509882

Int. Cl.² H01Q 19/14

U.S. Cl. 343—781 P 2 Claims



1. An antenna, comprising a number of parabolic cylinder

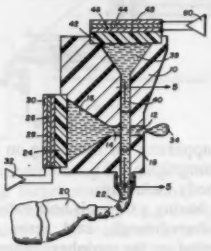
surfaces as reflectors, which are mounted confocally with a common plane of symmetry and a radiator that can emit a substantially plane wave, whose plane is substantially perpendicular to the plane of symmetry of the reflectors next to the radiator in the path of rays, wherein the antenna comprises more than two substantially parabolic cylinder surfaces, each pair of which has in common one line-focus and one plane of symmetry, the line-foci intersecting or crossing each other.

4,024,544

MENISCUS DAMPENING DROP GENERATOR

Richard H. Vernon, Richardson, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 21, 1975, Ser. No. 634,314
Int. Cl.² G01D 15/16
U.S. Cl. 346—1 18 Claims



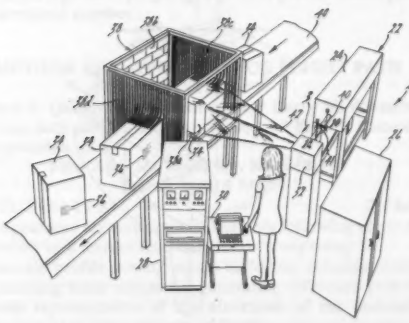
18. A method for dampening a meniscus vibration amplitude in a liquid drop generator comprising: effecting a first pressure to express a liquid droplet through an outlet orifice, said expression of the droplet by the first pressure resulting in an inherent meniscus vibration amplitude after the droplet leaves the orifice, substantially dampening said inherent meniscus vibration amplitude and thereby decreasing the period of meniscus stabilization by generating a pressure front of such magnitude and duration within an effective meniscus dampening vicinity of the outlet orifice at substantially the same instant the droplet leaves the orifice.

4,024,545

LASER-EXCITED MARKING SYSTEM

Terence S. Dowling, San Ramon; Robert J. Dompe, Cupertino; Harry G. Heard, Woodside, all of Calif., and Keith K. Hazard, Rosslyn, Va., assignors to MB Associates, San Ramon, Calif.

Continuation of Ser. No. 462,807, April 22, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,217
Int. Cl.² G01D 9/40
U.S. Cl. 346—76 L 10 Claims

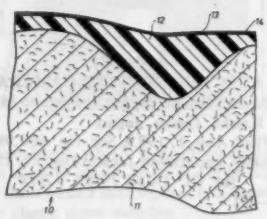


1. A marking system for marking alphanumeric and symbolic characteristics on an article with a source of coherent electromagnetic energy capable of transmitting sufficient energy to the article to mark the article in response to predetermined information, the improvement comprising generating means for generating pulses of uniform intensity of a fine beam of coherent electromagnetic radiation, storage means for storing said predetermined information as a representation of at least some of the alphanumeric and symbolic characters in the form of a series of separate, discrete *a* and *b* co-ordinates in a preselected grid arrangement which can be plotted to define the alphanumeric and symbolic characters by a series of dots, source control means for sequentially altering the path of the source of energy between the source and the article in an *x* and *y* grid framework including first altering means for altering the said path in the *x* direction and second altering means for altering the said path in the *y* direction, said *x* and *y* grid framework forming a matrix of a preselected number of *x* and *y* co-ordinates for representing the information to be marked, each set of said preselected number of said *x* and *y* co-ordinates defining a general area into which a complete one of said some of the alphanumeric and symbolic characters will be placed, *x* and *y* control means including a first *x* control connected to said first altering means for controlling the position of said first altering means in said *x* direction and a second *y* control connected to said second altering means for controlling the position of said second altering means in said *y* direction and for directing said path to each of said preselected number of said *x* and *y* co-ordinates in a preselected sequence, input means for receiving said predetermined information and connected in controlling relation with said control means for controlling said first and second altering means in response to said predetermined information, each of said general areas being of sufficient two dimensional size to include all of the variations of said *a* and *b* co-ordinates, *a* and *b* control means including a first a co-ordinate control connected to said first altering means for controlling the position of said first altering means in said a co-ordinate direction and *a* second *b* co-ordinate control connected to said second altering means for controlling the position of said second altering means in said *b* co-ordinate direction, and pulse control means connected to the source for pulsing the source when the source is directed at the article by the predetermined *x*, *y*, *a* and *b* information for each of said dots for said alphanumeric and symbolic characters to be marked on the article, said source control means includes reflecting means for reflecting coherent electromagnetic radiation from said source onto the article and including a pair of reflecting mirrors, each of which is positionable over a range of positions to reflect the coherent electromagnetic radiation from said source in one of said two dimensions, said first and second control means includes means for generating a first control signal for one of said mirrors and a second control signal for the other of said mirrors, said first and second altering means including a rotary positioning means for each mirror, each rotary positioning means including an under damped scan galvanometer being responsive to the corresponding control signal for positioning its mirror to selected locations about an axis of rotation in accordance with the corresponding control signal, each said scan galvanometer having a known time constant equal to the time required to displace the associated mirror from its initial position to a maximum overshoot position in response to an input of known magnitude, said control signal providing a first pulse having a magnitude selected such that the maximum overshoot position for that first pulse substantially corresponds to a desired one of said selected locations and providing a second pulse applied in accordance with said known time constant at the time said maximum overshoot position is attained and hence when said desired one of said selected locations is attained and with said second pulse having a magnitude corresponding to said desired one of said selected locations whereby oscillation about said desired one of said selected locations is minimized.

4,024,546
METAL-COATED CARRIER FOR RECORDINGS AND PROCESS FOR DETERMINING THE OXYGEN-ATTACHED ALUMINUM CONTENTS IN THE COATING

Klaus Brill, Korntal; Eberhard Traub, Stuttgart; Alfred Ortlieb, Stuttgart; Wolfgang Grothe, Stuttgart, and Friedrich Scholl, Stuttgart, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Mar. 2, 1972, Ser. No. 231,342
Claims priority, application Germany, Mar. 9, 1971, 2111274
Int. Cl.² G01D *15/34*; B32B *15/04*
U.S. Cl. 346—135 12 Claims

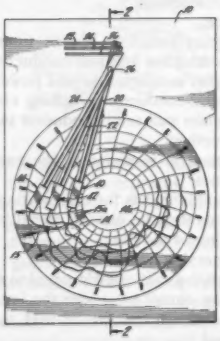


1. A carrier for recordings, particularly for recordings produced by selectively burning away portions of the carrier, comprising a ribbon of insulating material; and a layer for the production of recordings provided on said ribbon and having a minimum thickness of about 250 angstroms, said layer including a minimum of about 15 percent by weight of aluminum in the form of a substance selected from the group consisting of aluminum oxide, aluminum oxide hydrate and mixtures of aluminum oxide and aluminum oxide hydrate, and said layer further including at least one element selected from the group consisting of cobalt, silicon, germanium, chromium and nickel, the remainder of said layer being predominanty metallic aluminum, and the total aluminum content of said layer being a minimum of about 80 percent by weight.

4,024,547
INSTRUMENT RECORDING PEN

Jerald Carl Raahauge, Escondido, Calif., assignor to Kingmann-White, Inc., Placentia, Calif.

Filed Aug. 13, 1975, Ser. No. 604,261
Int. Cl.² G01D *15/16*, *9/38*, *9/30*
U.S. Cl. 346—140 A 12 Claims



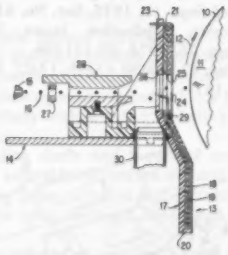
1. In a recording instrument having a plurality of lightweight pen arms mounted on a pivot axis and means for moving the arms over the surface of a chart in response to a condition to be recorded, said chart having a plurality of curved lines representing time which are spaced at predetermined time intervals, such as fifteen minutes, said lines being on a radius about equal to the average distance between said axis and the tips of pens to be mounted on said arms, said arms being spaced different distances from the chart so that a first arm closest to the chart can move between the chart and a second arm spaced further from the chart:

a disposable, self-contained pen to be mounted on the end of each of said arms, each of said pens having a substantially closed plastic cartridge containing a fiber material soaked in ink and including a nib holder formed integral with a wall of the cartridge and a writing nib positioned in said holder with one end extending into the cartridge and the other end extending out of the cartridge and having a writing tip to engage the chart, each of said cartridges having a generally flat rectangular cross-section to minimize the space requirement for the cartridges in a direction away from the chart so that the cartridges do not interfere with each other when the first cartridge is moved between the second cartridge and the chart, the pen nib and holder to be mounted on said first arm being located adjacent one end of its cartridge and angled away from the other end of its cartridge, the pen nib to be mounted on said second arm being longer than the first nib and being located adjacent one end of its cartridge and angled toward the other end of its cartridge so that the tips of said pen nibs when mounted on the instrument arms in overlapping relation are positioned closer together than if each nib extended at the same orientation with respect to its cartridge, the distance between the tips of said pen nibs being equal to the distance between said time lines at a reference location on said chart, said pens each weighing less than 1 gram so that a minimum amount of hysteresis error is introduced into the recordings being made.

4,024,548
LIQUID ABSORBING ASSEMBLY WITH TWO POROSITIES

Victor Manuel Alonso, Roundrock, Tex.; David Roy Cialone, Richmond; George Romeo Ducharme, Lexington, both of Ky., and Paul Douglas Ginnings, Roundrock, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 7, 1976, Ser. No. 693,809
Int. Cl.² G01D *15/18*
U.S. Cl. 346—140 R 14 Claims



1. An assembly for absorbing ink from an ink mist produced by ink droplets of an ink jet stream striking a recording medium including:

a first porous material disposed adjacent the recording medium to absorb ink from the ink mist produced by the ink droplets striking the recording medium;

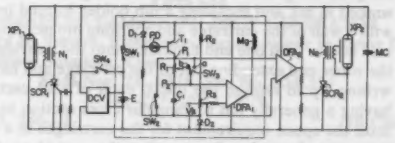
and a second porous material disposed in contact with said first porous material and having a smaller porosity than said first porous material to absorb ink from said first porous material.

4,024,549

AUTO-STROBE MEANS FOR CAMERAS

Kunio Matsumoto, Ageo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed May 27, 1975, Ser. No. 580,755
Claims priority, application Japan, May 30, 1974, 49-61110
Int. Cl.² G03B 7/16
U.S. Cl. 354—33 3 Claims



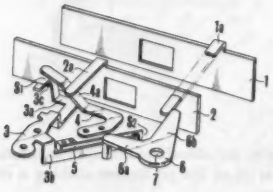
1. An auto-strobe flash means for a camera comprising a main flash discharge tube, means responsive to the opening of a shutter of said camera for energizing the flash discharge tube, a photoelectric element for receiving light from said flash discharge tube reflected by an object to be photographed and generating a photoelectric current in response to said light, a transistor connected to said photoelectric element to conduct a constant current proportional to the amount of the photoelectric current generated in said photoelectric element, a variable resistor connected to said transistor, a capacitor connected to said variable resistor, a first differential amplifier having one input terminal connected to the connecting point of said transistor and said variable resistor and another input terminal connected to said variable resistor, said first differential amplifier having its output electrically interconnected to said flash discharge tube energizing means for controlling the termination of energization of said discharge tube, means for controlling the closing of said shutter, and a second differential amplifier having one input terminal connected to the connecting point of said variable resistor and said capacitor and another input terminal connected to said variable resistor, said second differential amplifier having its output electrically interconnected to said shutter closing controlling means, said first and second differential amplifiers being respectively operative to produce outputs in accordance with a bias voltage established by said variable resistor.

4,024,550

FLASH SYNCHRONIZING DEVICE FOR A CAMERA

Mutsunobu Yazaki; Noriaki Sanada, both of Yokohama, and Tetsuya Taguchi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 18, 1975, Ser. No. 614,604
Claims priority, application Japan, Sept. 26, 1974, 49-111285; Sept. 26, 1974, 49-111286
Int. Cl.² G03B 15/03, 13/02, 9/40
U.S. Cl. 354—147 5 Claims



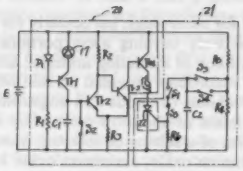
1. In a camera having a slit type shutter including opening and closing blades for performing a run-down movement to permit temporary passage of light, a flash synchronizing device comprising three contacts, the first and second contacts constituting a first switch element and the second and third contacts constituting a second switch element, said first switch element being arranged to cooperate with said opening blade in such a manner that when the movement of said opening blade is terminated, said first contact is brought into contact with the said second contact, and said second switch element being arranged to cooperate with said closing blade in such a manner that when said closing blade begins to run down, said third contact is taken out of contact with said second contact, said switch elements being connected in series so as to disable a flash when one of the switch elements is open.

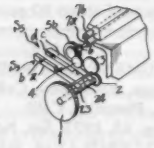
4,024,551

ELECTRIC SHUTTER CAMERA

Kayoshi Tsujimoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 1, 1975, Ser. No. 600,981
Claims priority, application Japan, Aug. 29, 1974, 49-99699
Int. Cl.² G03B 19/02, 17/42
U.S. Cl. 354—51 8 Claims





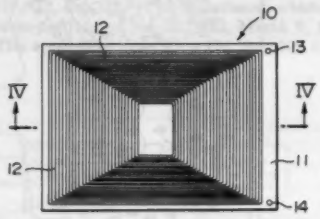
1. A camera comprising:
a power source;
a semi-conductor switching circuit transferable between relatively conductive and non-conductive states;
an electromagnet connected to said power source in series with said semi-conductor switching circuit so as to be energized when said semi-conductor switching circuit is made conductive;
a shutter opened in response to the energization of said electromagnet;
manually operable means for transporting a film;
means for generating an electric signal in response to the transportation of the film;
a manually operable member;
means for applying said electric signal to said semi-conductor switching circuit to render the latter conductive, in response to the operation of said manually operable member; and
means for permitting said electric signal to be applied to said semi-conductor switching circuit when the film is in a position where the transportation thereof has been completed.

4,024,552

ELECTROMAGNETICALLY DRIVEN OPTICAL BLADE

Toshihiro Kondo, Chofu, Japan, assignor to Toshihiro Kondo, Chofu and Fuji Photo Film Co., Ltd., Minami-ashigara, both of, Japan

Filed Mar. 16, 1976, Ser. No. 667,418
Claims priority, application Japan, Mar. 28, 1975, 50-37511
Int. Cl.² G03B 9/08; H02K 41/02
U.S. Cl. 354—234 7 Claims



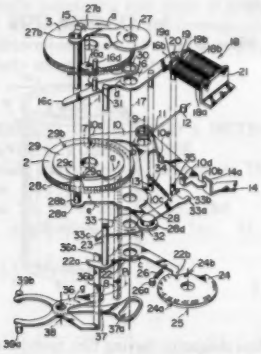
1. An optical blade which is electromagnetically driven comprising an opaque plastic sheet member and an electromagnetic coil sheet sealed therein, said coil sheet extending in parallel to the plastic sheet member.

4,024,553

ELECTRICAL FOCAL PLANE SHUTTER WITH MECHANICAL CONTROL MECHANISM OPERATIVE UPON ELECTROMAGNETIC FAILURE

Yoshihisa Maitani; Akihiko Hashimoto, and Fujio Enomoto, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 15, 1975, Ser. No. 577,697
Claims priority, application Japan, June 6, 1974, 49-64427
Int. Cl.² G03B 9/34
U.S. Cl. 354—242 3 Claims



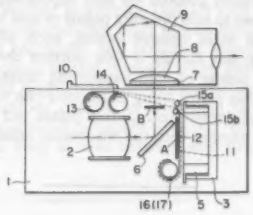
1. An electrical focal plane shutter including a shutter detent mechanism, the shutter comprising:
a first blind gear for driving a first blind of the shutter;
a second blind gear for driving a second blind of the shutter;
first and second detent members for locking the first and second blind gears, respectively, against rotation;
drive means interlocked with a shutter release member for driving the first detent member from a first position towards a second position to thereby release the first blind gear to permit rotation thereof;
an electromagnet assembly including control means movable from a first position to a second position for operating said second detent member to release the second blind gear at a given exposure period after the commencement of a running of the first blind to thereby permit the second blind gear to begin running;
first means on said second detent member for engaging said first detent member, said second detent member maintaining said control means in its first position when said first detent member is in its first position and releasing said control means to move to its second position when said first detent member has moved at least to an intermediate position which is located between its first and its second positions, said first detent member being incapable of releasing said first blind gear until it has moved to its second position;
a control member for controlling the operation of said first detent member, second means on said second detent member said control member engaging said second means and movable responsive to said second means to assume a first position in which the control member prevents the first detent member from moving beyond its intermediate position when said first detent member has moved to its intermediate position and when the electromagnet assembly is inoperable due to a reduction in the output of a power source therefor and for assuming its second position in which it releases the first detent member from engaging the first blind gear when the first detent member has moved to its intermediate position and when the electromagnet assembly is operating in a normal manner.

4,024,554

FOCAL PLANE FOR PHOTOGRAPHIC CAMERAS

Tadao Hayami, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Sept. 30, 1975, Ser. No. 618,241
Claims priority, application Japan, Oct. 3, 1974, 49-119507
Int. Cl.² G03B 9/32
U.S. Cl. 354—242 3 Claims



1. A photographic camera comprising:
a camera body therein including a photographing lens, an exposure aperture formed behind said photographing lens, and a viewing aperture formed in a plane intersecting rectangularly with a plane including said exposure aperture:
a pair of winding shafts and a pair of unwinding shafts respectively rotatably supported on said camera body, one pair being arranged below said exposure aperture and the other pair being arranged above said photographing lens;
a front curtain secured at one end to one of the winding shafts of said pair and at the other end to one of the unwinding shafts of said pair and having a shielding portion and a pair of open portions formed in the lengthwise direction on both sides of said shielding portion;
a rear curtain secured at one end to the other of the winding shafts of said pair and at the other end to the other of the unwinding shafts of said pair and having a shielding portion and an open portion formed in the lengthwise direction adjacently to said shielding portion; and
at least one guide roller supported rotatably on said camera body and engaged with said front curtain and rear curtain

to change the running direction of said front curtain and rear curtain, said viewing aperture being kept open except at the time of winding up said front curtain and rear curtain and running them for the exposure,

wherein said photographic camera further comprises a finder unit mounted removably on said camera body and coordinated with said viewing aperture.

4,024,555

FOCAL PLANE SHUTTER FOR CAMERAS

Nobuyoshi Inoue, Kawagoe, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Aug. 29, 1974, Ser. No. 501,617

Claims priority, application Japan, Aug. 31, 1973, 48-97950; Mar. 11, 1974, 49-27863

Int. Cl.² G03B *9/38*

U.S. Cl. 354—249 **3 Claims**

1. A focal plane shutter for cameras including opening and closing shutter blades, said shutter comprising:

a base plate having an exposure aperture therein, said exposure aperture having opposed long side edges and short side edges,

a first and second pair of supporting arms each pivoted with one end thereof on said base plate at one side of said short side edges of said exposure aperture,

two main opaque thin plates each having an end edge for forming an exposure slit parallel with said long side edges of said exposure aperture, said opaque thin plates each being directly pivoted on respective free ends of said supporting arms, said opaque plates each having a side portion thereof near pivoting points of said supporting arms,

at least two auxiliary opaque thin plates positioned proximate each main thin opaque plate for covering said exposure aperture, said auxiliary opaque thin plates each being directly pivoted on said supporting arms at positions closer to said pivoting points of said supporting arms than said main opaque plates, each of said auxiliary opaque plates having a side portion thereof near said pivoting points of said supporting arms, said auxiliary opaque thin plates being positioned one upon another on each of said main opaque thin plates and being arranged to move parallel with the associated main thin plate.

4,024,556

SIGNALING ARRANGEMENT FOR AN ELECTRICAL SHUTTER

Nobuyoshi Inoue, and Munetaka Shimizu, both of Kawagoe, Japan, assignors to Copal Company Limited, Tokyo, Japan

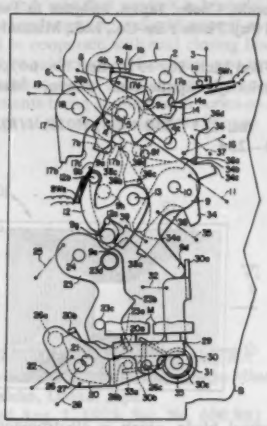
Filed Sept. 15, 1975, Ser. No. 613,562

Claims priority, application Japan, Sept. 17, 1974, 49-110838[U]

Int. Cl.² G03B *17/38*

U.S. Cl. 354—266 **2 Claims**

1. A shutter mechanism comprising a base plate, a front blade actuating member rotatably supported on said base plate, a rear blade actuating member rotatably supported on said base plate, an interlocking lever rotatably supported on said base plate and engageable with said rear blade actuating member, a signaling lever rotatably supported on said base plate and engageable with said front blade actuating member and interlocking lever, and a spring connected between said base plate and signaling lever to bias said signaling lever in one direction, said signaling lever being directly prevented from its motion by said front blade actuating member when said front blade actuating member is started prior to said rear blade actuating member by the shutter releasing operation and being moved to a predetermined position to indicate an improper shutter operation without being prevented by said front blade actuating member when said rear blade actuating



member is started prior to said front blade actuating member by the shutter releasing operation.

4,024,557

FILM MAGAZINE HAVING FILM SPEED INDICATING MEANS

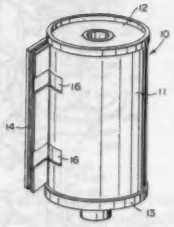
Keikchi Aoyama; Keeji Kaneko, both of Minami-ashigara; Katsuji Muramatsu, and Ikuo Fuutagawa, both of Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 1, 1975, Ser. No. 601,395

Claims priority, application Japan, Aug. 2, 1974, 49-92419[U]

Int. Cl.² G03B *17/26*

U.S. Cl. 354—275 **8 Claims**



1. A film magazine having film speed indicating means for a camera loaded with a roll film comprising

a cylindrical portion made of metal sheet applied with an insulating coating layer, said cylindrical portion being provided with a film outlet slot portion, and

a pair of end covers fixed at the opposite ends of the film magazine,

the improvement comprising a film speed indicating means provided on the cylindrical portion of the film magazine, said film speed indicating means being comprised of selectively provided non-coated conductive sections of said cylindrical portion of the film magazine, said sections being selectively provided in an inaccessible portion of the film magazine in accordance with a predetermined binary code system wherein said inaccessible portion is an area behind said film outlet slot portion.

4,024,558

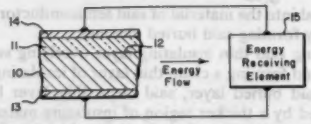
PHOTOVOLTAIC HETEROJUNCTION DEVICE EMPLOYING A GLASSY AMORPHOUS MATERIAL AS AN ACTIVE LAYER

Seymour Merrin, Fairfield, Conn., assignor to Innotech Corporation, Norwalk, Conn.

Continuation of Ser. No. 455,310, March 27, 1974, abandoned, which is a continuation-in-part of Ser. No. 227,933, Feb. 22, 1972, Pat. No. 3,801,879, which is a continuation-in-part of Ser. No. 122,420, March 9, 1971, abandoned, said Ser. No. 455,310, is a continuation-in-part of Ser. No. 227,932, Feb. 22, 1972, abandoned, which is a continuation-in-part of Ser. No. 122,422, March 9, 1971, abandoned. This application Apr. 23, 1976, Ser. No. 679,580

Int. Cl.² H01L *15/00*

U.S. Cl. 357—2 6 Claims



1. A photovoltaic device for generating electrical energy in response to incident electromagnetic radiation in a predetermined spectral range comprising:

a semiconductive substrate exhibiting one kind of electronic conductivity;

disposed upon said substrate and forming a junction therewith, a continuous layer of glassy amorphous material exhibiting the other kind of electronic conductivity, said layer of glassy amorphous material being substantially transparent to electromagnetic radiation in said predetermined spectral range, having a resistivity of less than about 10^7 ohm cm. and having an electron affinity which is substantially equal to or less than the electron affinity of the material forming said semiconductive substrate for providing reduced junction impedance to carrier flow;

means for electrically contacting said substrate; and

means for electrically contacting said layer of glassy amorphous material while permitting electromagnetic radiation in said predetermined spectral range to impinge upon said layer of glassy amorphous material.

4,024,559

ELECTROLUMINESCENT DIODES AND A METHOD OF MANUFACTURING SAME

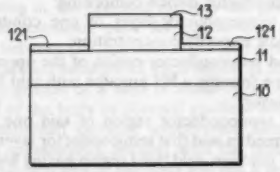
Beaudouin de Cremoux, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Jan. 26, 1976, Ser. No. 652,284

Claims priority, application France, Jan. 31, 1975, 75.03102

Int. Cl.² H01L *33/00, 29/161*

U.S. Cl. 357—17 5 Claims



1. An electroluminescent diode comprising a first and a second semiconductor element having respectively a first and a second type of conductivity, said second type being opposite to the first, said elements forming a rectifying junction, said first element having a central zone and a peripheral zone, a semiconductor zone being inserted in said central zone having said first type of conductivity, said semiconductor zone being made of a material having a band gap, narrower than those of said first and second elements, and terminal contact means over surfaces of said first and second elements to supply a voltage such that only said semiconductor zone is capable of emitting light rays.

4,024,560

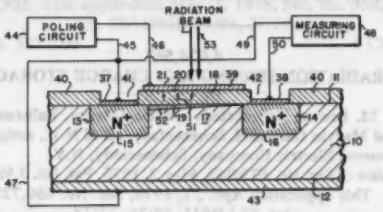
PYROELECTRIC-FIELD EFFECT ELECTROMAGNETIC RADIATION DETECTOR

Robert C. Miller; Shu-Yau Wu, both of Pittsburgh, and George W. Roland, Monroeville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 4, 1975, Ser. No. 610,365

Int. Cl.² H01L *29/78, 23/56*

U.S. Cl. 357—23 12 Claims



1. A pyroelectric-field effect electromagnetic radiation detector comprising:

A. a semiconductor body of a given conductivity type having opposed major surfaces;

B. first and second electrodes spaced apart from each other in ohmic contact with the semiconductor body to form a conductive channel in said body between said electrodes;

C. a pyroelectric body having opposed major surfaces substantially normal to a polar axis thereof and having one said major surface in intimate contact with a major surface of the semiconductor body at least between said first and second electrodes and polarized therethrough substantially normal to said opposed major surfaces at least between said first and second electrodes; and

D. a gate electrode capable of absorbing radiation to be detected positioned adjacent a major surface of said pyroelectric body at least between said first and second electrodes.

4,024,561

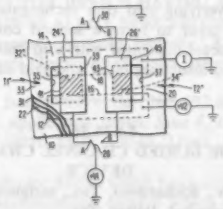
FIELD EFFECT TRANSISTOR MONITORS

Ashwin Kantilal Ghatalia, Essex Junction, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 1, 1976, Ser. No. 672,687

Int. Cl.² H01L *29/78, 27/02;* G01R *27/02, 27/14*

U.S. Cl. 357—23 10 Claims



1. A monitoring system for determining channel widths comprising,

a semiconductor substrate having a first conductivity region and first and second parallel strips of a second conductiv-

ity disposed at one surface thereof within said first conductivity region,

a first conductive strip having a nominal width and a second conductive strip having a nominal width arranged parallel to each other and extending between said first and second parallel strips for forming first and second conductive channels, respectively, in said first conductivity region,

a thin dielectric medium interposed between said conductive strips and said substrate,

means for selectively applying a first voltage between said first conductive strip and said first parallel strip and for selectively applying a second voltage between said second conductive strip and said first parallel strip, and

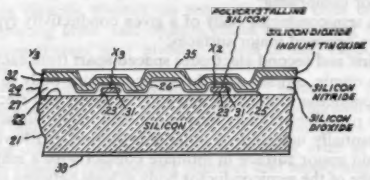
means for measuring current flow in said second parallel strip upon application of said first voltage and upon application of said second voltage to determine in relationship with the nominal width of at least one of said conductive strips the widths of said first and second channels.

4,024,562

RADIATION SENSING AND CHARGE STORAGE DEVICES

Dale M. Brown, Schenectady; Mario Ghezzo, Ballston Lake, and Marvin Garfinkel, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 573,842, May 2, 1975, Pat. No. 3,988,613.
This application Apr. 27, 1976, Ser. No. 680,729
Int. Cl.² H01L *29/78, 27/14*
U.S. Cl. 357—23 **1 Claim**



1. A semiconductor device comprising

a substrate of semiconductor material having a major surface,

a thick layer of insulating material overlying said major surface and having a thin portion of rectangular outline, said thin portion overlying a rectangular region in said major surface of identical outline,

a conductor having a pair of parallel sides overlying said rectangular thin portion of said insulating material, said sides being orthogonal to and extending from one side of said thin rectangular portion to the opposite side thereof and being included between and spaced from the other sides of said thin rectangular portion, said conductor forming a first conductor-insulator-semiconductor capacitor with said rectangular thin portion of said insulating layer and said substrate,

a second conductor insulated from said first conductor and entirely overlying said thin rectangular portion of said insulating layer to form a second conductor-insulator-semiconductor capacitor with said rectangular thin portion of said insulating layer and said substrate.

4,024,563

DOPED OXIDE BURIED CHANNEL CHARGE-COUPLED DEVICE

Al F. Tasch, Jr., Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

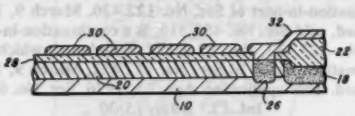
Filed Sept. 2, 1975, Ser. No. 609,268
Int. Cl.² H01L *29/78, 21/265*
U.S. Cl. 357—24 **6 Claims**

1. A buried channel charge coupled device produced by the steps of:

a. forming a thin layer of insulating material at the surface of a semiconductor substrate,

b. implanting dopant ions into said layer of insulating material while controlling the energy of the ion implantation source to ensure that the peak of the distribution of dopant ions occurs in said thin layer of insulating material,

c. heating the insulated semiconductor substrate to cause dopant ions to diffuse from said thin layer of insulating



material into the material of said semiconductor substrate thereby forming said buried channel

d. stripping said thin insulating layer overlying said buried layer and forming a clean thin layer of insulating material over said buried layer, said clean thin layer being surrounded by a thicker region of insulating material; and

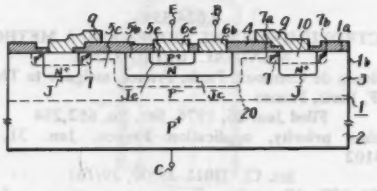
e. forming a plurality of phase electrodes above and insulated from said buried channel.

4,024,564

SEMICONDUCTOR DEVICE HAVING AT LEAST ONE PN JUNCTION AND CHANNEL STOPPER SURROUNDER BY A PROTECTURE CONDUCTING LAYER

Takashi Shimada, Yamoto; Shinishi Saiki, Zama, and Akio Kayanuma, Odawara, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 13, 1975, Ser. No. 604,093
Claims priority, application Japan, Aug. 19, 1974, 49-94820
Int. Cl.² H01L *29/34, 29/40, 29/48, 29/56*
U.S. Cl. 357—53 **6 Claims**



1. A semiconductor device comprising:

a. a first semiconductor layer of one conductivity type having low impurity concentration;

b. a second semiconductor region of the opposite conductivity type forming a PN junction with said first semiconductor layer;

c a third semiconductor region of said one conductivity type formed in said first semiconductor layer surrounding said PN junction, said third region having higher impurity concentration than that of said first layer;

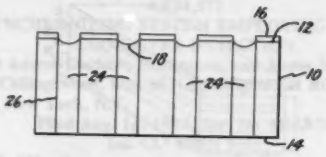
d. a passivation layer covering at least said PN junctions; and

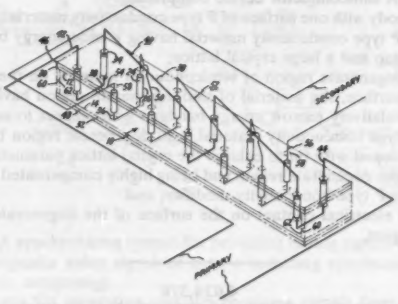
e. a conductive layer extending on said passivation layer covering at least the inner periphery of said third semiconductor region and connected to said first semiconductor layer through a fourth region of said opposite conductivity type, said fourth region forming an electric barrier layer with said first and third regions.

4,024,565
DEEP DIODE SOLID STATE TRANSFORMER

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 410,999, Oct. 30, 1973, abandoned. This application Feb. 27, 1975, Ser. No. 553,903
Int. Cl.² H01L 27/02, 29/04, 29/06
U.S. Cl. 357—51 13 Claims





1. A solid state transformer comprising

a body of semiconductor material having two opposed major surfaces forming respectively the top and bottom surfaces of the body, a predetermined level of resistivity, a predetermined first type conductivity, a preferred crystal structure and a vertical axis substantially perpendicular to the major opposed surfaces and a first preferred crystal axis of the material;

at least one of the opposed major surfaces having a predetermined crystal planar orientation which is one selected from the group consisting of (100), (110) and (111);

a plurality of regions of recrystallized semiconductor material of the body having a second and opposite type conductivity than that of the body and a predetermined level of resistivity formed in the body and each of which has a vertical axis so oriented as to be aligned approximately parallel with the first preferred crystal axis;

each of the plurality of regions extending between, and terminating in, the opposed surfaces and providing a low electrical resistance path for conducting an electrical current between the opposed major surfaces;

the recrystallized material of each region is formed in situ by the migration of a melt of metal-rich semiconductor material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first crystal axis and the vertical axis of the body and has a predetermined level of concentration of the metal of the melt as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration and the metal is distributed substantially uniformly throughout the entire region;

the metal consisting of at least one dopant impurity material to impart the type conductivity and level of resistivity to the recrystallized material of the region;

a P-N junction by the contiguous surfaces of the recrystallized material of each region and the material of the body;

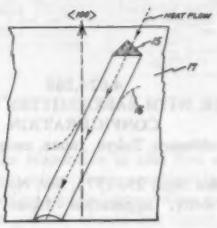
first means for electrically connecting selective ones of the plurality of regions into a series electrical circuit arrangement to function as a primary winding of the transformer, and

second means for electrically connecting the remaining ones of the plurality of regions into a series electrical circuit arrangement so as to function as a secondary winding of the transformer.

4,024,566
DEEP DIODE DEVICE

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 411,009, Oct. 30, 1973, Pat. No. 3,902,925. This application Mar. 3, 1975, Ser. No. 554,590
Int. Cl.² H01L 29/04, 27/10
U.S. Cl. 357—60 4 Claims



1. A deep diode device comprising a matrix body of semiconductive material of first-type semiconductivity in the form of a single crystal having <100> axial orientation, a recrystallized region of semiconductive material of a second-type semiconductivity extending in a straight line into the matrix body, and a P-N junction at the interface between the matrix body crystal and the recrystallized region having its major axis disposed at an angle of 2° to 10° from the <100> axis of the single crystal toward a direction selected from the group consisting of the <010> and the <001> direction, said recrystallized region of semiconductive material being formed in situ by the migration of a melt of a metal-rich semiconductor material through the matrix body at a predetermined elevated temperature along a thermal gradient and being of substantially constant thickness throughout its length and having a constant uniform level of impurity concentration throughout its length as determined by the solid solubility limit of that metal of the melt in that semiconductor material of that matrix body at that predetermined elevated temperature of migration.

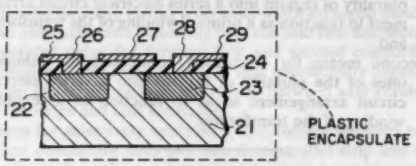
4,024,567
SEMICONDUCTOR DEVICE HAVING AL-MN OR AL-MN-SI ALLOY ELECTRODES

Seiichi Iwata, Sayama; Akitoshi Ishizaka, Kokubunji, and Hiroshi Yamamoto, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed June 4, 1976, Ser. No. 692,638
Claims priority, application Japan, June 4, 1975, 50-66545
Int. Cl.² H01L 23/48, 29/40, 23/48, 29/46
U.S. Cl. 357—67 19 Claims

1. In a semiconductor device which has a conductive wiring layer having a predetermined pattern which extends on an insulating film provided on a semiconductor substrate and which is connected with predetermined regions within said substrate via openings provided in said insulating film, the improvement wherein said conductive wiring layer is made of material selected from the group consisting of an alloy having

a composition containing 0.05 – 6 percent by weight of Mn, the remainder being composed essentially of Al, and an alloy



having a composition containing 0.05 – 6 percent by weight of Mn and 0.8 – 5 percent by weight of Si, the remainder being composed essentially of Al.

4,024,568

TRANSISTOR WITH BASE/EMITTER ENCIRCLEMENT CONFIGURATION

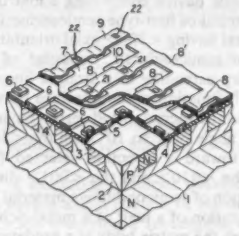
Masayoshi Yoshimura, Tokyo, Japan, assignor to Hitachi, Ltd., Japan

Filed Sept. 29, 1975, Ser. No. 617,809

Claims priority, application Japan, Sept. 27, 1974, 49-110530

Int. Cl.² H01L *23/48, 29/72, 27/10, 29/34*

U.S. Cl. 357—68 **4 Claims**



1. A transistor comprising:

a base region of a first conductivity type having an oblong shape and formed in a major surface of a collector region of a second conductivity type, wth a plurality of separated emitter regions of the second conductivity type being formed along a line in said base region;

a first layer of insulating material selectively disposed on the major surface of said emitter, base, and collector regions so as to selectively expose prescribed portions thereof;

first emitter electrodes formed on each emitter region;

a first ladder-shaped base electrode having long side portions and interconnecting rung portions formed on said base region so as to completely surround said emitter regions;

first collector electrodes formed on said collector region in parallel to the long side portions of said base electrode at both sides thereof;

a second layer of insulating material overlying said first layer of insulating material and said first emitter, base and collector electrodes and having apertures therethrough exposing said plurality of first emitter electrodes; and

a second emitter electrode formed on said second layer of insulating material and contacting said first emitter electrodes through the apertures of said second layer of insulating material.

4,024,569

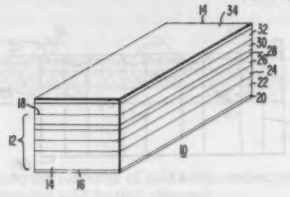
SEMICONDUCTOR OHMIC CONTACT

Frank Zygmunt Hawrylo, Trenton, and Henry Kressel, Elizabeth, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 8, 1975, Ser. No. 539,532

Int. Cl.² H01L *29/161, 29/04, 29/167, 23/48*

U.S. Cl. 357—71 **11 Claims**



1. A simiconductor device comprising:

a body with one surface of P type conductivity material, siad P type conductivity material having a wide energy bandgap and a large crystal lattice;

a degenerate region of semiconductor material on the one surface, the material of said degenerate region having a relatively narrow energy bandgap with respect to said P type conductivity material, said degenerate region being doped with tin to enlarge the crystal lattice parameter of the degenerate region and being highly compensated with a P type conductivity modifier; and

an electrical contact on the surface of the degenerate region.

4,024,570

SIMPLIFIED HOUSING STRUCTURE INCLUDING A HEAT SINK FOR A SEMICONDUCTOR UNIT

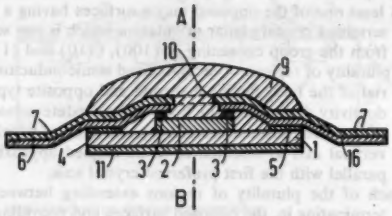
Gunter Hartmann; Joachim-Ulrich Schwarz, and Klaus Keil, all of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 5, 1975, Ser. No. 610,757

Claims priority, application Germany, Sept. 17, 1974, 2444418

Int. Cl.² H01L *23/02, 23/48, 29/46, 29/54*

U.S. Cl. 357—81 **11 Claims**



1. A simple, low-cost housing structure for a semiconductor component or integrated circuit, in particular for insertion thereof into a layer circuit arrangement or conductor board, comprising a metal base plate of good heat conductivity, forming the bottom of the structure, and having a bottom and a top face, and upon the top face of which the semiconductor component is disposed, the latter being provided with upwardly extending contact elements, plastic foil means provided with individual metal films disposed above and contacting the respective contact elements, said metal films extending from the respective contact elements laterally outward relative thereto, and then downwardly to the base plate, with each metal film being insulated from the base plate by a plastic film, the contacted semiconductor component, and adjacent side of the base plate being protected by a plastic mass covering the

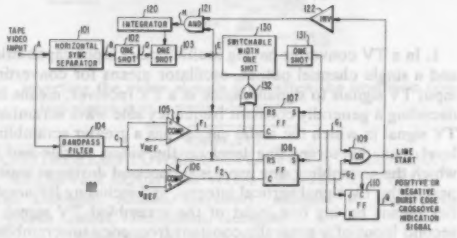
same, to rigidly maintain said base plate, semiconductor component and metal contacting films in assembled relation thereby forming a unitary structure insertible in a cooperable circuit arrangement or conductor board, with said metal films directly connectible thereto for effecting the electrical connection of said semiconductor component or integrated circuit.

4,024,571

SYNCHRONIZING SYSTEM EMPLOYING BURST CROSSOVER DETECTION

Robert Adams Dischert, Burlington, and James Morgan Walter, Collingswood, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 14, 1975, Ser. No. 604,670
Int. Cl.² H04N 9/46
U.S. Cl. 358—4 **3 Claims**



1. A synchronizing system for providing timing signals from a composite video signal of a type including synchronizing signals, comprising:

means for separating said synchronizing signals from said composite video signal into at least a horizontal synchronizing signal component representative of the beginning of television line and a color signal component the phasing of which varies with respect to said horizontal synchronizing signal component;

means coupled to said separating means for developing a timing reference signal from the leading edge of said horizontal sync component;

first comparator means coupled to said separating means and to said timing means for comparing said timing reference signal with a selected positive crossover of said color signal component;

second comparator means coupled to said separating means and to said timing means for comparing said timing reference signal with a selected negative crossover of said color signal component; and

output means coupled to said comparator means for developing a timing signal which represents said horizontal sync component referenced to the first occurring output signal from said first and second comparator means.

4,024,572

PAL ALTERNATE LINE COLOR PHASE DETECTOR

William Joseph Derenbecher, Jr., Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.

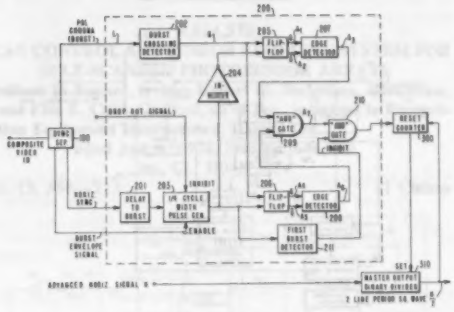
Filed Mar. 29, 1976, Ser. No. 671,561
Claims priority, application United Kingdom, May 20, 1975, 21549/75; Mar. 23, 1976, 21549/75
Int. Cl.² H04N 9/47
U.S. Cl. 358—18 **8 Claims**

1. A color burst phase detector for developing a color burst switching signal at a two-line period from a phase alternate line (PAL) composite video signal, said composite video signal including at least color burst and horizontal synchronizing components, said detector comprising:

a first source of signals related to said color burst component from each line of said television signal, said signal reversing in polarity every other one of said lines;

a source of periodic enabling signals in predetermined relation to said horizontal sync component, said enabling signals having a predetermined duration between leading and trailing edges;

first logic means responsive to said first signal source, said first logic means being enabled by the trailing edge of said enabling signals for providing a first output signal indicative of the polarity of said first signal;



second logic means responsive to said first signal source, said second logic means being enabled by the leading edge of said enabling signals for providing a second signal indicative of the polarity of said first signal; and

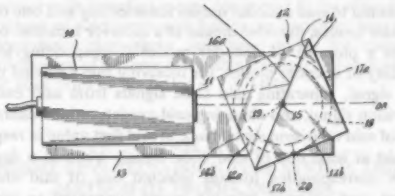
output means responsive to coincident output signals from said first and second logic means for providing an output signal at said two-line period representative of the polarity of the burst phasing with respect to said horizontal synchronizing component.

4,024,573

SCANNING TV CAMERA

W. Robert Carnes, 32 Phillips Lane, Darien, Conn. 06820

Filed Apr. 19, 1976, Ser. No. 677,923
Int. Cl.² H04N 7/18
U.S. Cl. 358—87 **5 Claims**



1. A scanning TV camera system comprising:

a TV camera having a lens and an optical axis of the lens;

a double dove prism having an internal surface that is reflective on both sides at the interface of two dove prisms joined together base to base to form the double dove and having four refracting faces relatively positioned as sides of a square;

said double dove prism having an axis of rotation in the plane of said interface on a line at which planes that are at right angles to said refracting faces intersect;

said double dove prism being mounted for rotation in front of said lens with its axis of rotation substantially normal to the optical axis of said lens; and

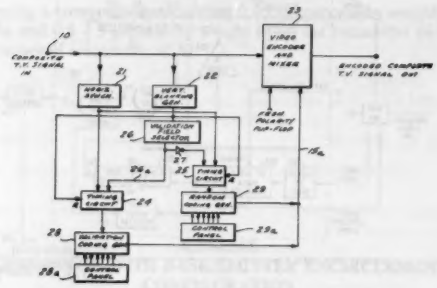
means for oscillating the double dove prism about its said axis a predetermined angular amount less than 180°, whereby a view of substantially 360° around the prism is obtained.

4,024,574

VALIDATION METHOD AND APPARATUS FOR PAY TELEVISION SYSTEMS

Norman Nieson, Massapequa, N.Y., assignor to Teleglobe Pay TV System Inc., Rego Park, N.Y.

Filed Feb. 26, 1975, Ser. No. 553,436
Int. Cl.² H04N 1/44
U.S. Cl. 358—117 12 Claims



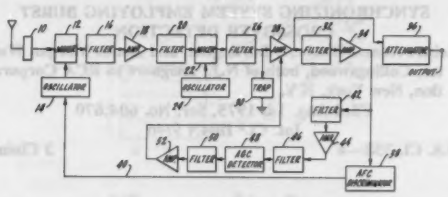
2. In a pay television system having transmitter means at a transmitter location for transmitting an encoded television signal, means connected to said transmitter means for furnishing a plurality of code signals each differing from the others of said code signals and inserting said code signals into said television signal prior to transmission, encoder means connected to said transmitter means and said means for furnishing a plurality of code signals and operable in a plurality of encoder modes, for changing a predetermined characteristic of said television signal from a first to a second value in response to at least one of said code signals selected in accordance with a selected one of said encoder modes, code selector means connected to said encoder means for selecting said one of said encoder modes, decoder means at a receiver location, operable in a plurality of decoder modes corresponding to said plurality of encoder modes, for receiving said encoded television signal, separating said code signals from said encoded television signal, and changing said predetermined characteristic of said television signal back to said first value in response to said at least one of said code signals when in a decoder mode corresponding to said selected one of said encoder modes, and program selector means connected to said decoder means for switching said decoder means to said corresponding decoder mode: a method for furnishing a validation signal only if said decoder means is in said corresponding decoder mode, comprising, in combination, the steps of generating at said transmitter location a predetermined validation pattern of code signals, said predetermined pattern of code signals being adapted to create a determined sequence of signal levels in said decoder means only if said decoder means is in said corresponding decoder mode; periodically suppressing the insertion of said plurality of code signals into said television signal and substituting therefor said predetermined validation pattern of code signals; transmitting said encoded television signal including said predetermined validation pattern of code signals to said decoder means; monitoring said decoder means to detect said sequence of signal levels if present; and furnishing said validation signal in response to a so-detected sequence.

4,024,575

CATV SINE WAVE CODING SYSTEM

Ralph P. Harney, Wonder Lake, Ill., and Stanley E. Gulf, Madison, Ill., assignors to Oak Industries Inc., Crystal Lake, Ill.

Continuation-in-part of Ser. No. 451,490, March 15, 1975. This application Apr. 30, 1975, Ser. No. 573,046
Int. Cl.² H04N 1/44
U.S. Cl. 358—118 8 Claims



1. In a TV converter having multichannel input capabilities and a single channel output, oscillator means for converting input TV signals to signals usable in a TV receiver, means for decoding a generally constant frequency sine wave scrambled TV signal in which the audio carrier has a greater scrambling level than the scrambling level on the video carrier and in which the scrambling sine wave is suppressed during at least a part of the TV signal vertical interval, and including RF amplifier means having one input of the scrambled TV signal, a second input of a generally constant frequency unscrambling sine wave, and an output of the unscrambled TV signal varied by a residual of said sine wave, a detector connected to the output of said amplifier means for detecting the residual sine wave, audio carrier filter means connected between said RF amplifier and detector, an amplifier connected to said detector for raising the level of the detected residual sine wave, with the output of said amplifier being connected to said RF amplifier means for providing the unscrambling sine wave, and an AFC circuit connected between said RF amplifier output and said oscillator means.

4,024,576

METHOD AND APPARATUS FOR SCRAMBLING AND UNSCRAMBLING COMMUNICATION SIGNALS

Albert F. Hartung, Woodland Hills; Frank W. Lehan, Santa Barbara; Charles T. Barooshian, Pacific Palisades, and Edward J. Zacharski, Malibu, all of Calif., assignors to System Development Corporation, Santa Monica, Calif.

Division of Ser. No. 388,439, Aug. 15, 1973, Pat. No. 3,919,462. This application Sept. 2, 1975, Ser. No. 609,577
Int. Cl.² H04N 1/44
U.S. Cl. 358—124 11 Claims

1. For use with receivers in a subscription television system, a method of unscrambling television video signals scrambled by inversion of portions corresponding to preselected lines in a television picture, comprising the steps of:

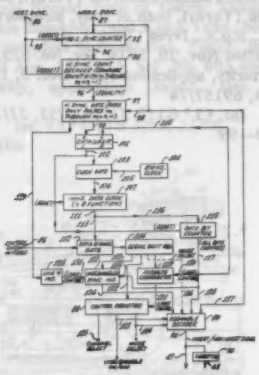
receiving and decoding unscrambler mode selection signals encoded from time to time in vertical blanking intervals of the video signals;

storing said unscrambler mode selection signals in register means; and

selectively inverting the video signals in accordance with a mode determined by the unscrambler mode selection signals, said step of selectively inverting including

scrambling the signals stored in the register means according to a predetermined pattern,

deriving an inversion indicator signal from the scrambled stored signals, and



inverting the video signals only when the inversion control signal is in a particular state.

4,024,577

CONTROLLED POWER SUPPLY FOR A TELEVISION RECEIVER EQUIPPED WITH REMOTE CONTROL

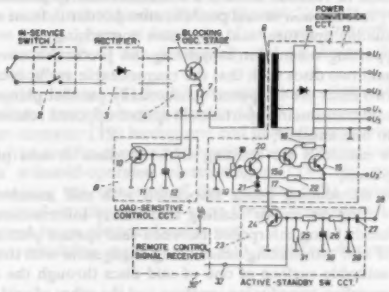
Otto Diethelm, Adlum, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany

Filed Nov. 20, 1975, Ser. No. 633,805

Claims priority, application Germany, Dec. 10, 1974, 2458302

Int. Cl.² H04N 5/44

U.S. Cl. 358—190 **9 Claims**



1. A power supply circuit for a television receiver equipped for remote control comprising, in combination:

an on-off switch for connecting and disconnecting the television receiver and its power supply circuit respectively to and from the electricity supply mains;

pulse generating means arranged for energization through said on-off switch;

an isolation transformer having its primary winding supplied with the output of said pulse generating means;

a power conversion circuit connected to the secondary winding of said isolation transformer for energization thereby, for supplying an operating voltage for the scanning circuits of the television receiver and for supplying a plurality of other voltages to said receiver, at least one of which other voltages is also supplied to said scanning circuits;

a remote control signal receiver for remote control of said television receiver and controlled switching means responsive to said remote control receiver for switching said television receiver between a stand-by condition and an operating condition, both said remote control receiver and said controlled switching means being connected to a secondary winding of said isolation transformer for energization thereby, said controlled switching means having a switching path for connecting and disconnecting said scanning circuits of said television receiver respectively to and from a source of said operating voltage in said power conversion circuit and

means for reducing energy transfer through said pulse generating means to said isolation transformer when said television receiver is in the stand-by condition.

4,024,578

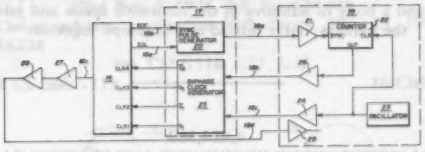
SCAN CONTROL AND SENSOR SAMPLING SYSTEM FOR SELF-SCANNED PHOTOSENSOR ARRAYS

Medford D. Sanner, Irving; Robert M. McMillan, Carrollton, and Ellis K. Cave, Garland, all of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Filed Jan. 6, 1976, Ser. No. 646,980

Int. Cl.² H04N 3/14

U.S. Cl. 358—213 **11 Claims**



1. In a scan control and sensor cell sampling system for a self-scanned array of photo sensor cells the output of which is a video signal, the combination which comprises:

a. signal generating means receiving timing signals from said array for limiting the amplitude swing of said timing signals and forming a single synchronization signal from said timing signals;

b. clock signal generating means responsive to said synchronization signal for substantially reducing fixed pattern odd/even noise in the output video signal of said array and for forming biphase clock signals to control the scanning of said array, each clock signal being substantially in phase with its complement throughput the band width of the operating frequencies of said array; and

c. sensor cells sampling means connected to the video signal output of said array and having an apparent low input impedance throughout said band width for complete recharging of a sensor cell within a sensor cell scan period at scan rates of the order of 1.8 MHz.

4,024,579

PROJECTION TELEVISION TUBE SYSTEM AND METHOD OF PRODUCING SAME

George R. Hergenrother, Watertown, and Henry E. Kloss, Cambridge, both of Mass., assignors to Advent Corporation, Cambridge, Mass.

Division of Ser. No. 502,768, Sept. 3, 1974. This application June 4, 1976, Ser. No. 692,948

Int. Cl.² H04N 5/74, 5/645

U.S. Cl. 358—231 **1 Claim**

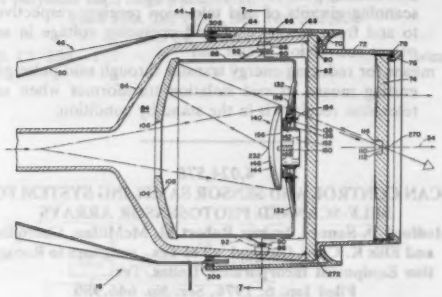
1. A projection television tube having, in combination,

an envelope with a face plate sealed thereto to define an evacuated space with a projection axis passing through said plate,

a generally cylindrical inner shroud mounted on the surface of the face plate and having an optical correction lens mounted therein,

a generally cylindrical outer shroud surrounding the face plate and a portion of the envelope with a clearance space therebetween, said inner and outer shrouds having mutually engaging portions adapted to fix their positions on the

face plate longitudinally of the projection axis while forming a clearance for relative movement of the shrouds during assembly in directions lateral to said axis,



harness means extending into the clearance space and being adapted for mounting the tube to an external support, and a body of adhesive in the clearance space and joining the harness, outer shroud and envelope together.

4,024,580

MAGNETIC SOUND RECORDING AND PLAYING BACK APPARATUS

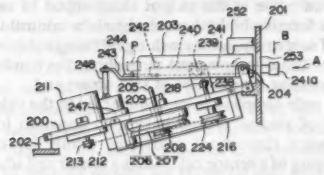
Itsuki Ban, 829, Higashi Ohizumi, Nerima, Tokyo, and Kasunori Mochizuki, 6673, Ohaza Hodaka, Hodakamachi, Minamiazumi, Negano, both of Japan

Filed Aug. 4, 1975, Ser. No. 601,436

Claims priority, application Japan, Aug. 2, 1974, 49-87996; Nov. 15, 1974, 49-131174

Int. Cl.² G11B *5/54, 15/00*

U.S. Cl. 360—96 **21 Claims**



1. In magnetic sound recording and playing back apparatus of the type comprising a cassette holder adapted to receive a cassette containing a magnetic tape, and operating lever carrying a magnetic head and a pinch roller, a capstan, means for driving said capstan, means for moving said operating lever so as to move said magnetic head and said pinch roller toward and away from said magnetic tape and said capstan respectively, and a mode switching mechanism, the improvement wherein said mode switching mechanism comprises driving means for said operating lever for selectively performing playing back, rewinding, stop and rapid feeding, and coupling means for operating said driving means from the means for driving said capstan wherein said driving means and said coupling means comprises an idle wheel, means for normally holding said capstan, a reduction gearing for reducing the speed of said idle wheel at a predetermined ratio, means responsive to an electric signal for urging said idle wheel against said capstan thus driving the idle wheel, means for disengaging said idle wheel from said capstan for stopping said idle wheel when it makes one revolution, and a rotary cam driven by said reduction gearing and disposed to drive said operating lever.

4,024,581

APPARATUS FOR WRITING ON, AND/OR READING, MAGNETIC DISCS

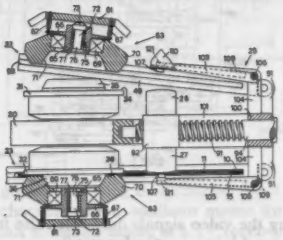
Piercarlo Lesca, Palazzo Canavese (Turin), and Giorgio Bonzano, Ivrea (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Nov. 20, 1974, Ser. No. 525,736

Claims priority, application Italy, Dec. 5, 1973, 70566/73; July 8, 1974, 69157/74

Int. Cl.² G11B *5/016, 5/55, 21/10*

U.S. Cl. 360—99 **8 Claims**



1. An apparatus for writing on and/or reading simultaneously two magnetic discs of flexible type, each disc including a single magnetizable surface having a plurality of substantially circular tracks concentric therebetween wherein binary information is serially storable following a predetermined circular order, each one of said discs being contained in a protective cover provided with a transducing aperture disposed radially relative to the enclosed disc to expose a portion of said magnetizable surface, wherein each one of said discs is rotatable inside the corresponding cover in a predetermined direction of rotation around a rotational axis to present said binary information in said predetermined order in front of said transducing aperture; said apparatus comprising:

supporting means for supporting the protective covers of said two discs such that the magnetizable surfaces of said two discs are in spaced substantially parallel planes with said transducing apertures in spaced opposed relationship to one another;

two mandrels for rotating said two discs in said parallel planes;

two transducing heads associated with said mandrels for writing on and/or reading said binary information, said heads being interposed between said spaced planes, one of said transducing heads being engageable with the magnetizable surface of one of said discs through the corresponding transducing aperture and the other of said transducing heads being engageable with the magnetizable surface of the other of said discs through the corresponding transducing aperture;

a single carriage disposed between said spaced planes;

guiding means for guiding said carriage along a radial axis parallel to said transducing apertures and interposed between said spaced planes;

means mounting said heads on said carriage, said mounting means supporting each said head faced towards its respective said disc, said heads not being cantilevered with respect to the carriage and being at a minimum distance from said radial axis;

positioning means connected with said carriage for positioning said two heads with respect to said tracks of said two discs along said transducing apertures; and a single driving means for rotating said mandrels in opposite directions, so that the magnetizable surface of each disc rotates in said predetermined direction of rotation with respect to its respective head to present said binary information in said predetermined order whereby the two discs are interchangeable therebetween.

4,024,582
TRACK CHANGE-OVER MECHANISM FOR A MULTI-CHANNEL TAPE

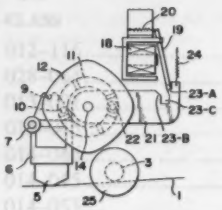
Itsuki Ban; Sumio Nozaki, both of Tokyo; Takanori Kasuya, Kodaira; Yukio Shinkado, and Kanji Yano, both of Tokyo, all of Japan, assignors to Itsuki Ban, Tokyo, Japan

Filed Aug. 18, 1975, Ser. No. 605,406

Claims priority, application Japan, Dec. 27, 1974, 49-148788

Int. Cl.² G11B 5/55, 21/08

U.S. Cl. 360—106 **10 Claims**



1. A track change-over apparatus for shifting a cam follower (10) of a magnetic head (5) in a multichannel tape recorder including a rotary capstan (3, 25) for driving a tape (1), at least one magnetic head (5) adapted to act on the tape and a rotating stepped cam (11) with *n* cam steps angularly arranged with space angle of 360°/*n* (wherein *n* is the number of channels of track on the tape) for steppingly shifting the magnetic head through the cam follower (10) affixed to the magnetic head, said cam follower (10) abutting against the steps of said rotating stepped cam, comprising:

a. pivotally supported lever means (21) with a free end;

b. an idler (12) rotatably supported on a said lever free end for engagement with said capstan (3, 25);

c. a second rotating cam (8) having *n* notches (33) arranged on its periphery at intervals of an angle of 360°/*n* and rotatable about its axis coaxially and synchronously with said idler;

d. spring means (34) for biasing said idler so that said idler moves away from said capstan (3, 25);

e. an actuator (19) having one end pivotally supported and a free end for engaging with said second rotating cam (8);

f. a solenoid-operated electromagnet (18) disposed for pressing the free end of the actuator (19) against the second rotating cam (8) when the electromagnet is energized by an electrical pulse; and

g. a restraining member (27, 41) mounted disposed for restraining the retreat of the free end of said actuator which takes place when the free end is in engagement with the outer periphery portion except the notches of said second rotating cam so as to effect the contact of said idler with said capstan, whereby, when said electromagnet is energized, said idler is pressed against the capstan through the engagement of the free end of the actuator with the notch of the second rotating cam and is rotatively driven by the capstan through the contact of the free end of the actuator with the outer periphery portion except the notches of said second rotating cam until the free end engages the next notch of the second cam to thereby displace the stepped cam through the space angle of 360°/*n* for shifting the magnetic head by one step.

4,024,583
MAGNETIC HEAD

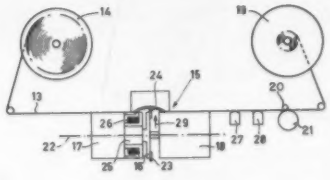
Nanno Van Slageren, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 628,949

Claims priority, application Netherlands, Dec. 13, 1974, 7416234

Int. Cl.² G11B 5/25, 5/12

U.S. Cl. 360—119 **10 Claims**



1. A magnetic head for magnetisation over at least a part of the width of a magnetizable record carrier to be conveyed passed the head, comprising a first flat circular plate of the magnetizable material, a second flat circular plate of magnetizable material having thereon an outer cylindrical collar and spaced therefrom an inner central boss coaxial with said collar, and a coil located on said boss, said first plate bearing against said boss, and said first plate and said cylindrical collar being spaced apart to define an annular operational gap, whereby the magnetic head is adapted for magnetizing a tape conveyed past the head parallel to the axis of the boss.

DESIGN PATENTS

GRANTED MAY 17, 1977

ERRATA

For CLASS	See PATENT NO.
012–116	244,365
028–064	244,376
013–001	244,385
014–045	244,386
014–046	244,387
014–045	244,388
014–053	244,389
024–029	244,391
024–054	244,403

DESIGN PATENTS

GRANTED MAY 17, 1977

ERRATA

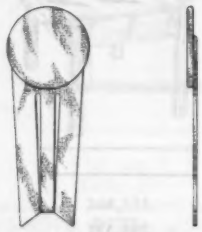
CLASS	PAGE	SEE PATENT NO.
D12-116		244,365
D25-004		244,376
D13-001		244,385
D14-045		244,386
D14-046		244,387
D14-045		244,388
D14-073		244,390
D24-029		244,391
D24-054		244,403

DESIGNS

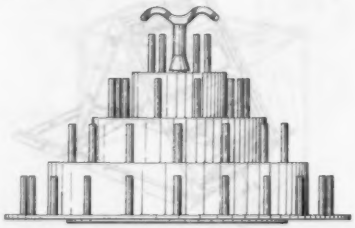
MAY 17, 1977

244,321
MEN'S SHIRT
Charles H. Phillips, 100 W. Franklin St., Richmond, Va. 23220
Filed Dec. 10, 1974, Ser. No. 531,292
Term of patent 3½ years
Int. Cl. D2—*02*
U.S. Cl. D2—208

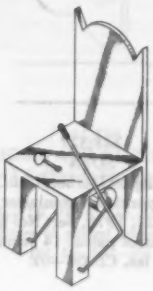
244,322
NECKWEAR
Walter W. Haines, Sr., 1511 Oakdale St., Philadelphia, Pa. 19132
Filed Jan. 20, 1975, Ser. No. 542,570
Term of patent 14 years
Int. Cl. D2—*05*
U.S. Cl. D2—351



244,323
SPOOL HOLDER
Rita M. Stone, 4635 Manchester Road, Akron, Ohio 44319
Filed Sept. 24, 1975, Ser. No. 616,182
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D3—19 D



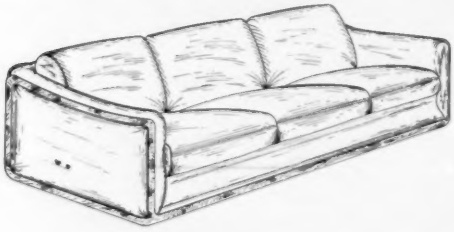
244,324
CHILD'S DOLL RETAINING CHAIR
Mike Garcia, 1008 Roxella, Houston, Tex. 77022
Filed June 30, 1975, Ser. No. 591,484
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—7



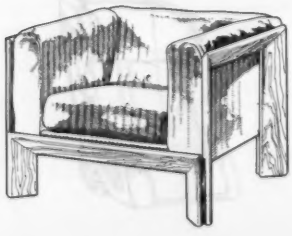
244,325
INFANT'S CAR SEAT
Charles Voytko, Bedford, Pa., assignor to Hedstrom Co., Bedford, Pa.
Filed Oct. 28, 1975, Ser. No. 626,309
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—7

244,326
CHAIR
Warren G. Taylor, 16707 Lakewood St., Tinley Park, Ill. 60477
Filed Mar. 21, 1975, Ser. No. 560,644
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—11

244,327
SOFA
Richard B. Saltz, Huntington Harbor, Calif., assignor to Charlton Company, Incorporated, Leominster, Mass.
Filed Jan. 21, 1976, Ser. No. 651,053
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



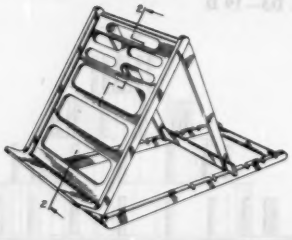
244,328
SEAT
Jules M. Heumann, South San Francisco, Calif., assignor to Metropolitan Furniture Manufacturing Company, South San Francisco, Calif.
Filed July 14, 1975, Ser. No. 595,564
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D—667



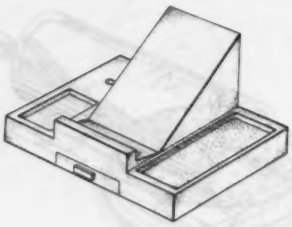
244,329
CHAIR
Ira Friedman, Somerset, N.J., assignor to Rowe Furniture Corporation
Filed Feb. 17, 1976, Ser. No. 658,688
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

244,330
CHAIR
Paul Silbaugh, Humboldt, Iowa, assignor to Gunder Manufacturing Company, Humboldt, Iowa
Filed Nov. 21, 1975, Ser. No. 634,041
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—78

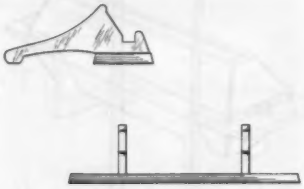
244,331
ADJUSTABLE POCKET CALCULATOR STAND
Pauline Woods, 3023 Copley Road, Akron, Ohio 44321
Filed May 30, 1975, Ser. No. 582,106
Term of patent 7 years
Int. Cl. D6—*99*
U.S. Cl. D6—85



244,332
CALCULATOR SUPPORT STAND
Charles Wayne Sullivan, 3849 Dieckman Lane, Cincinnati, Ohio 45245
Filed June 24, 1975, Ser. No. 589,869
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85

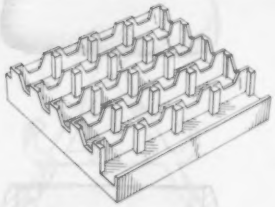


244,333
DISPLAY STAND
Tommie J. Kiester, Oklahoma City, Okla., assignor to Keyline Products, Oklahoma City, Okla.
Filed Mar. 22, 1976, Ser. No. 668,820
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85

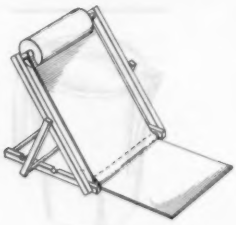


244,334
DESK
James S. Ferguson, 10111 N. Western, Oklahoma City, Okla. 73114
Filed Nov. 13, 1975, Ser. No. 631,848
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—175

244,335
DISPLAY STAND FOR TOOTHBRUSHES
Lars Hjelle, Oslo, Norway, assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Dec. 11, 1975, Ser. No. 639,666
Term of patent 14 years
Int. Cl. D20—*02*; D23—*02*
U.S. Cl. D6—188

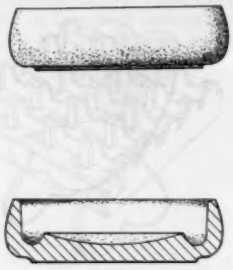


244,336
COMBINED HEAD AND BACKREST SUPPORT
Barry M. Stein, 7742 Redlands St., No. 3032, Playa Del Rey, Calif. 90291
Filed May 19, 1975, Ser. No. 578,464
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—200



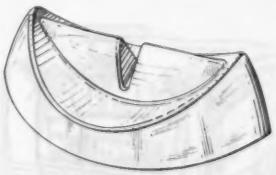
244,337
MUG
Morton L. Sirisky, Cherry Hill, and Richard Hellenbrecht, Manasquan, both of N.J., assignors to C & M Sports Interprises, Inc., Cherry Hill, N.J.
Filed Aug. 6, 1975, Ser. No. 602,242
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5

244,338
BOWL
LeRoy J. Yauger, 101 Cachagua Road, Carmel Valley, Calif. 93924
Filed July 30, 1975, Ser. No. 600,370
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—23

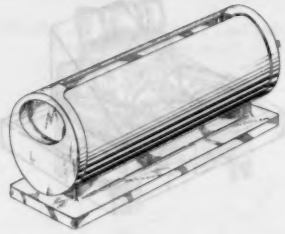


244,339
CARAFE
David W. Wendt, Monona, Wis., assignor to Will Ross, Inc.
Filed Sept. 29, 1975, Ser. No. 617,286
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—65

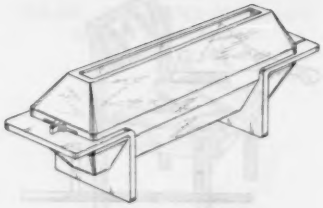
244,340
KNIFE REST OR THE LIKE
Harold P. Ashton, Providence, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Aug. 28, 1975, Ser. No. 608,491
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—74



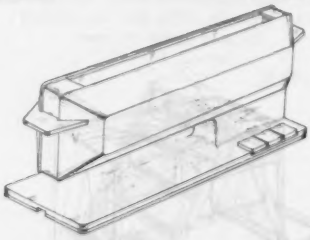
244,341
TOASTER
Thomas E. Hanson, Phoenixville, and Harry J. McVicker, Pottstown, both of Pa., assignors to SCM Corporation, New York, N.Y.
Filed Nov. 6, 1975, Ser. No. 629,254
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—93



244,342
TOASTER
Thomas E. Hanson, Phoenixville, and Harry J. McVicker, Pottstown, both of Pa., assignors to SCM Corporation, New York, N.Y.
Filed Nov. 6, 1975, Ser. No. 629,255
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—93

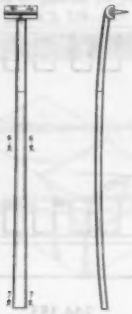


244,343
TOASTER
Thomas E. Hanson, Phoenixville, and Harry J. McVicker, Pottstown, both of Pa., assignors to SCM Corporation, New York, N.Y.
Filed Nov. 6, 1975, Ser. No. 629,256
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—93

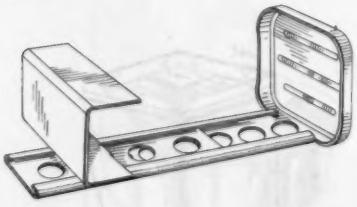


244,344
POPPER-GRILLER
Lawrence M. Rheingold, Baldwin, and Alfred P. Rheingold, Freeport, both of N.Y., assignors to Templet Industries, Inc., Plainview, N.Y.
Filed Sept. 23, 1975, Ser. No. 615,911
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—95

244,345
STRIGIL
Anthony Poveromo, 35-24 33rd St., Long Island City, N.Y. 11106
Filed June 21, 1976, Ser. No. 698,180
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—184



244,346
MARINE ENGINE LOCKING BAR
Kenneth D. Conners, 34 Cartier Crescent, Scarborough, Ontario, Canada
Filed Apr. 5, 1976, Ser. No. 673,482
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—339



244,347
REINFORCING ROD SUPPORT
Robert J. Ilukowicz, Coram, N.Y., assignor to Preco Industries, Ltd., Plainview, N.Y.
Filed July 23, 1976, Ser. No. 708,112
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—356

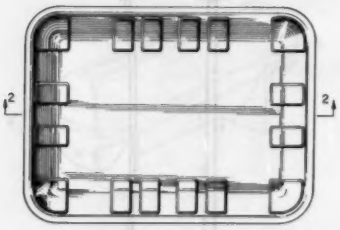
244,348
BOTTLE
Alfred D. Sterges, Los Angeles, Calif., assignor to Purex Corporation Ltd., Lakewood, Calif.
Filed June 30, 1975, Ser. No. 591,354
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—40

244,349
BOTTLE
Lucien O. Frohling, North Caldwell, N.J., assignor to General Foods Corporation, White Plains, N.Y.
Filed Sept. 12, 1975, Ser. No. 612,971
The portion of the term of this patent subsequent to Dec. 21, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—63

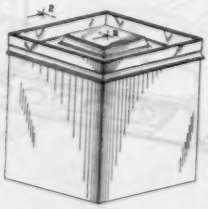
244,350
BOTTLE
Albert H. Torongo, Yardley, Pa., assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed June 24, 1975, Ser. No. 589,986
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—116

244,351
BOTTLE
John Pardo, Yonkers, N.Y., assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed July 8, 1975, Ser. No. 594,403
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—116

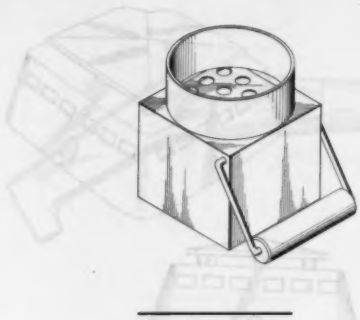
244,352
PACKAGING TRAY
Wayne L. Congleton, Whittier, Calif., assignor to Dolco Packaging Corporation, Burbank, Calif.
Filed June 23, 1975, Ser. No. 589,271
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—219



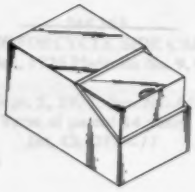
244,353
CARTON
Finn Skjelby, Spikkestad, and Svein Slungaard, Slemmestad, both of Norway, assignors to Elopak A/S, Spikkestad, Norway
Continuation-in-part of Ser. No. 510,021, Sept. 27, 1974, abandoned. This application Feb. 27, 1975, Ser. No. 553,544
Claims priority, application Norway, Sept. 4, 1974, 7456084
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—222



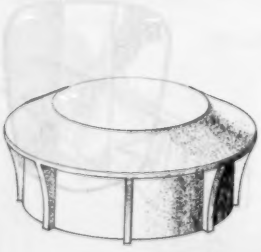
244,354
LOOSE FILL MATERIAL DISPENSING VALVE
James R. Green, 5550 Emerywood Drive, Buena Park, Calif. 90621, and Adolf Wegmann, 1710 Rosewood Drive, Monrovia, Calif. 91016
Filed Nov. 3, 1975, Ser. No. 628,359
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—290



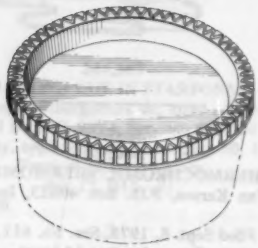
244,355
DISPLAY BOX
Lowell I. Mazie, 2126 Packard Road; Henry C. Friedman, 1906 Foothill Drive, both of Huntingdon Valley, Pa. 19006; Nathaniel Getzler, 1213 Davisville Road, Southampton, Pa. 18966, and Jack D. Grollman, 550 Lafayette Road, Merion, Pa. 19006
Filed Aug. 26, 1975, Ser. No. 607,769
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—224



244,356
CLOSURE CAP
John Pardo, Yonkers, N.Y., assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Sept. 8, 1975, Ser. No. 611,294
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—254



244,357
CONTAINER LID
Thomas Morrison Gardiner, Cookshire, Canada, assignor to Polysar Limited, Sarnia, Canada
Filed Sept. 8, 1975, Ser. No. 611,122
Claims priority, application Canada, Mar. 17, 1975, 1703753
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—267

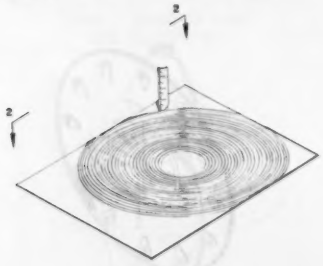


244,358
CLOCK
Albert D. Neal, 17272 Blue Fox Circle, Huntington Beach, Calif. 92647
Filed Mar. 12, 1976, Ser. No. 666,425
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—22

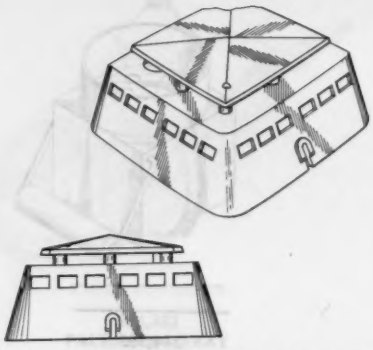
244,359
HOURGLASS PENDANT WATCH
Terry M. Haber, 3050 S. Bristol No. 8C, Santa Ana, Calif. 92707
Filed Oct. 20, 1975, Ser. No. 623,899
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—31

244,360
THERMOCHROMIC THERMOMETER
Philip L. Van Kersen, P.O. Box 40423, Indianapolis, Ind. 46240
Filed Sept. 8, 1975, Ser. No. 611,303
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—57

244,361
AUTOMOBILE FILTER GAUGE
Thomas L. Brown, 27972 Santa Domingo, San Juan Capistrano, Calif. 92675
Filed Aug. 13, 1974, Ser. No. 496,959
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64



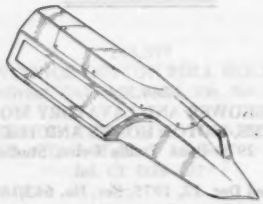
244,362
FIRE DETECTOR
Alvin A. Mayer, Littleton, Colo., assignor to Statitrol Corporation, Lakewood, Colo.
Filed June 16, 1975, Ser. No. 586,994
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106

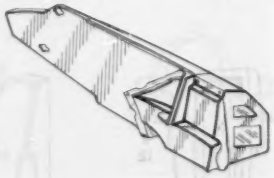


244,363
REFLECTOR
Sadaharu Tsuyama, Osaka, Japan, assignor to Tsuyama Manufacturing Co., Osaka, Japan
Filed Sept. 22, 1975, Ser. No. 615,472
Claims priority, application Japan, May 7, 1975, 50-18031
Term of patent 14 years
Int. Cl. D10—*99*
U.S. Cl. D10—111

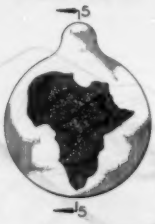
244,364
TIMING LIGHT
Howard J. Rasmussen, Fox River Grove, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill.
Filed July 17, 1975, Ser. No. 596,917
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—112

244,365
MOTORCYCLE SIDE CAR
Ghraydon L. Wallick, 1926 Placentia No. 9, Costa Mesa, Calif. 92627
Filed Sept. 5, 1975, Ser. No. 610,760
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—116

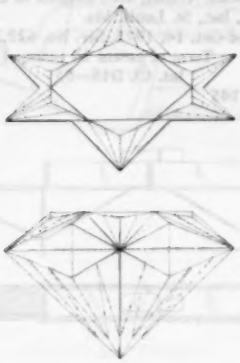




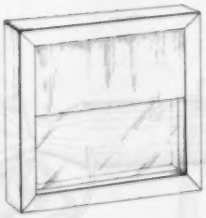
244,366
SOIL CONTAINING MEDALLION
Robert H. Milligan, 1019 S. 28th Ave., Hollywood, Fla. 33020
Filed Oct. 20, 1975, Ser. No. 624,047
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—81



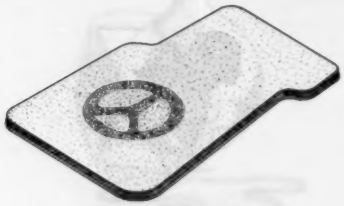
244,367
DIAMOND CUT IN STARFORM
George Saltzman, Arenbergstraat 40, 2000 Anvers, Belgium
Filed Dec. 18, 1974, Ser. No. 533,824
Claims priority, application Belgium, July 30, 1974, 57
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—90



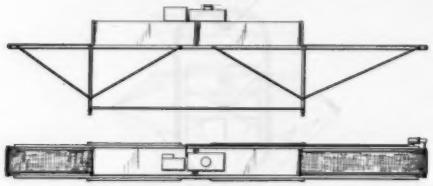
244,368
COMBINED DISPLAY PLAQUE AND FRAME
Donald L. Dean, 9331 Pioneer Blvd., Apt. 103, Santa Fe Springs, Calif. 90608
Filed May 23, 1975, Ser. No. 580,421
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—140



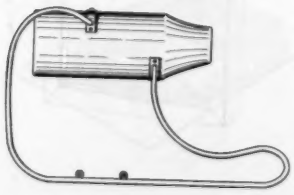
244,369
CAR MAT
Courtland J. Sample, 430 S. Wilton Place, Los Angeles, Calif. 90020
Filed Sept. 19, 1975, Ser. No. 614,806
Term of patent 14 years
Int. Cl. D6—*11*
U.S. Cl. D12—203



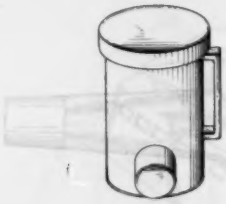
244,370
CONVEYOR DRYER
Eugene Landesman, Arnold, Mo., assignor to Lawson Printing Machine Co., Inc., St. Louis, Mo.
Filed Oct. 14, 1975, Ser. No. 622,385
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—145



244,371
CALF ROPING TRAINING AID
Don Parsons, Rte. 5, Box 143, Walla Walla, Wash. 99362
Filed June 2, 1975, Ser. No. 583,118
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—59

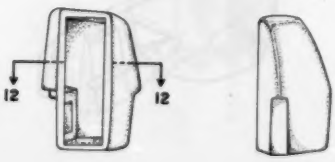


244,372
FISH BAIT DISPENSER
Jerry W. Kirkhart, 814 Whispering Way, South Charleston, W. Va. 25303
Filed Apr. 12, 1976, Ser. No. 675,832
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—14

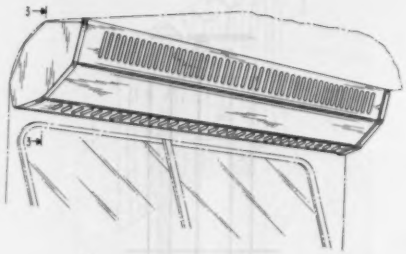


244,373
ARTIFICIAL FISHING LURE
David Edwin John Beer, 40 Efford Road, Higher Compton, Plymouth, Devon, and Phillip Leslie Thurston, 15 Cormorant Drive, Sandy Bay, St. Austell, Cornwall, both of England
Filed June 27, 1975, Ser. No. 590,999
Claims priority, application United Kingdom, Dec. 30, 1974, 969218/74
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

244,374
COMBINED SHOWER AND LAVATORY MODULE FOR CAMPERS, MOTOR HOMES AND THE LIKE
Sheldon Baer, 2970 Dona Emilia Drive, Studio City, Calif. 91604
Filed Dec. 22, 1975, Ser. No. 643,160
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—49

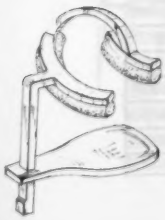


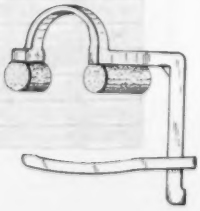
244,375
EVAPORATOR CASING OF A BUS AIR-CONDITIONER
Allen J. Samuels, Bethel Park, Pa., and Ronald D. Lemke, St. Paul, Minn., assignors to Thermo King Corporation, Minneapolis, Minn.
Filed July 14, 1975, Ser. No. 595,970
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—141



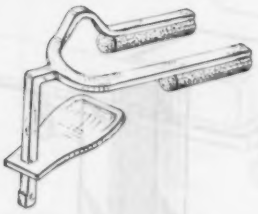
244,376
DENTAL FLOSS HOLDER
Ingram S. Chodorow, Stamford, Conn., assignor to Placontrol, Inc., Stamford, Conn.
Filed Oct. 31, 1975, Ser. No. 627,770
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D28—64

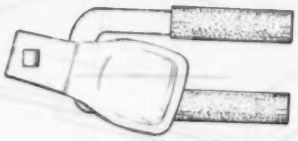
244,377
ANTERIOR COTTON ROLL HOLDER
Jack E. Sturdivant, Oakwood Road, Rte. No. 4, Ames, Iowa 50010
Filed Oct. 31, 1975, Ser. No. 627,529
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—8



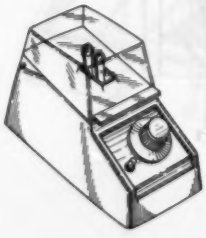


244,378
COTTON ROLL HOLDER
Jack E. Sturdivant, Oakwood Road, Rte. No. 4, Ames, Iowa 50010
Filed Oct. 31, 1975, Ser. No. 627,530
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—8

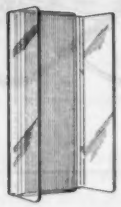




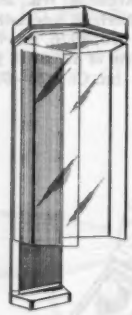
244,379
DENTAL AMALGAMATOR
Howard Moon, Fort Atkinson, Wis., assignor to Crescent Dental Mfg. Co. from Norland Associates, Lyons, Ill.
Filed Mar. 18, 1976, Ser. No. 668,149
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—10



244,380
TELEPHONE STAND
Richard Arthur Crump; John Scott Gibson, both of Ottawa, and Allan Joseph Solar, Arnprior, all of Canada, assignors to Northern Electric Company Limited, Montreal, Canada
Filed Aug. 13, 1975, Ser. No. 604,140
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—16

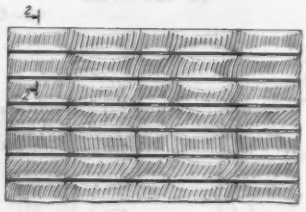


244,381
TELEPHONE BOOTH
Richard Arthur Crump; John Scott Gibson, both of Ottawa, and Allan Joseph Solar, Arnprior, all of Canada, assignors to Northern Electric Company Limited, Montreal, Canada
Filed Aug. 13, 1975, Ser. No. 604,141
Term of patent 14 years
Int. Cl. D25—*16*
U.S. Cl. D25—16

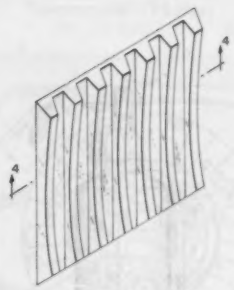


244,382
WALL PANEL MEMBER FOR MOUNTING WALL PANELS
Lloyd J. Scheid, 4404 Grimes Place, Encino, Calif. 91316
Filed Sept. 27, 1974, Ser. No. 510,029
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—73

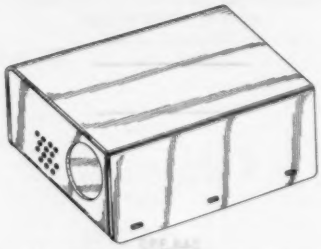
244,383
WALL PANEL
Stephen J. Tellman, Towners, and Oscar Selber, Carmel, both of N.Y., assignors to Champion International Corporation, Stamford, Conn.
Filed Jan. 17, 1975, Ser. No. 541,701
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—85



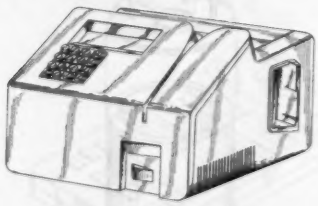
244,384
DECORATIVE PLASTIC COVER FOR DOORS
Warren G. Stichtenoth, Cincinnati, Ohio, assignor to American Standard, Inc., New York, N.Y.
Filed Dec. 16, 1974, Ser. No. 533,399
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—92



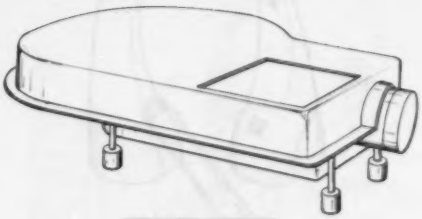
244,385
ULTRASONIC GENERATOR UNIT HOUSING
James W. McCord, 9829 Timberwood Circle, Louisville, Ky. 40223
Filed Jan. 3, 1975, Ser. No. 538,319
Term of patent 14 years
Int. Cl. D13—*01*
U.S. Cl. D13—1

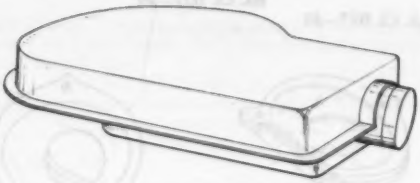


244,386
FINANCIAL SERVICES TERMINAL
David Lee Schaum, Woodstock, and John V. Stram, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed June 9, 1975, Ser. No. 585,151
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—45

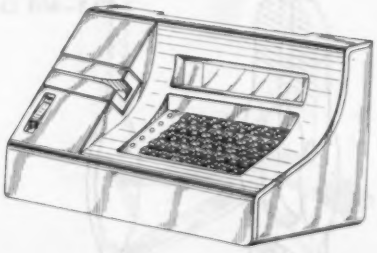


244,387
DISC-TYPE DATA FILE
Otto R. Butsch, Ann Arbor, Mich., assignor to Sycor, Inc., Ann Arbor, Mich.
Filed Nov. 24, 1975, Ser. No. 634,485
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

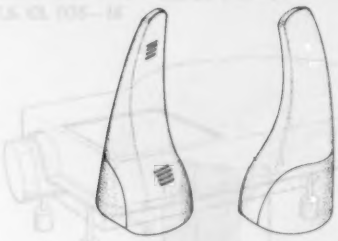




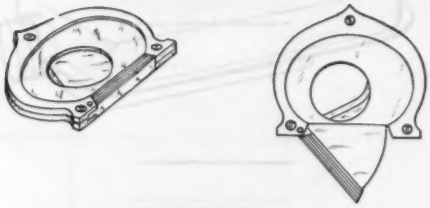
244,388
KEYBOARD READER DISPLAY TERMINAL
Ronald I. Conway, Port Ewen; Robert V. Jones, Woodstock, and Owen P. Shea, Kingston, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 15, 1976, Ser. No. 667,221
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—45



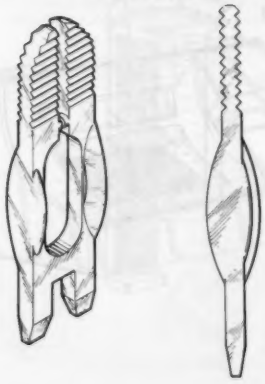
244,389
TELEPHONE
Peter P. Klepa, 3450 St. Susan Place, Los Angeles, Calif. 90066
Filed Sept. 16, 1975, Ser. No. 613,757
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—53



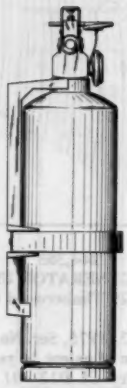
244,390
DESIGN FOR CIGAR CUTTER
Jacques Zimmermann, Saint-Cloud, France, assignor to Les Must de Cartier-France, Paris, France
Filed Feb. 20, 1976, Ser. No. 659,634
Claims priority, application France, Aug. 22, 1975, 74.131
Term of patent 14 years
Int. Cl. D27—*99*
U.S. Cl. D27—51



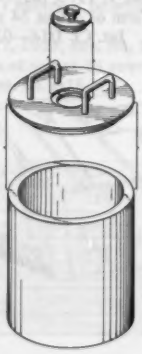
244,391
CLIP FOR HOLDING A LIQUID-SAMPLE CELL IN A SPECTROPHOTOMETER
Trevor John Stockdale, Cambridge, and George James Wicks, Milton, both of England, assignors to Pye Limited, Cambridge, England
Filed July 1, 1975, Ser. No. 592,326
Term of patent 14 years
Int. Cl. D24—*04, 99*; D8—*07*
U.S. Cl. D24—29



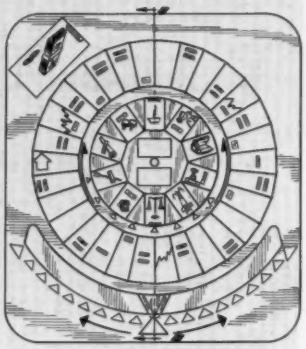
244,392
COMBINED FIRE EXTINGUISHER AND BRACKET
Roger Jay Montambo, Red Wing, Minn., assignor to The Ansul Company, Marinette, Wis.
Filed June 2, 1975, Ser. No. 582,920
Term of patent 14 years
Int. Cl. D29—*01*
U.S. Cl. D29—2



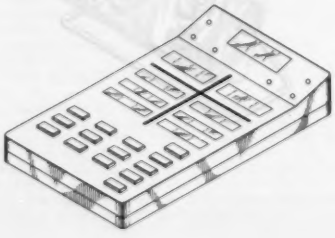
244,393
WASTE CONTAINER FOR RADIOACTIVE MATERIAL
Carl Collica, New Rochelle; Leonard Epifano, Rye, and Ralph Farella, Scarsdale, all of N.Y., assignors to Medi-Ray, Inc.
Filed Jan. 6, 1975, Ser. No. 538,575
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D29—6



244,394
GAME BOARD
Melvin Foss, Jr., and Marilyn J. Foss, both of Box 491, Winsted, Minn. 55395
Filed Mar. 26, 1975, Ser. No. 562,211
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

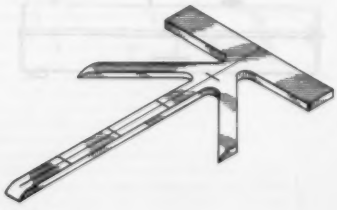


244,395
ELECTRONIC BRIDGE SCORER
William J. Garvey, 7521 Starfish Drive, Sarasota, Fla. 33581, and Joel Goldberg, 9827 Lauren Lane, Niles, Ill. 60648
Filed Aug. 18, 1975, Ser. No. 605,409
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13 A

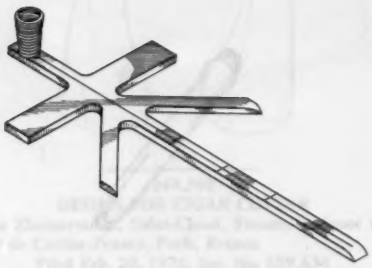


244,396
GAME DART SHAFT OR SIMILAR ARTICLE
Ronald A. Kurtz, Englewood, and Richard I. Manberg, Teaneck, both of N.J., assignors to Kulite Tungsten Corporation, Ridgefield, N.J.
Filed Oct. 24, 1975, Ser. No. 625,683
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 DA

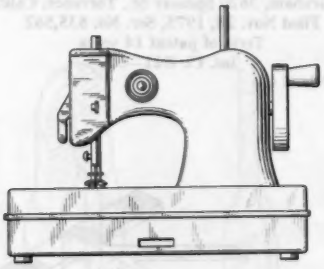
244,397
GOLF STROKE DIRECTION ALIGNER
James A. Graham, 3620 Spencer St., Torrance, Calif. 90503
Filed Nov. 28, 1975, Ser. No. 635,582
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB



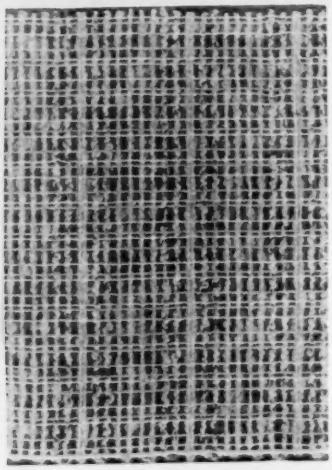
244,398
GOLF TEE AND DIRECTION ALIGNER
James A. Graham, 3620 Spencer St., Torrance, Calif. 90503
Filed Nov. 28, 1975, Ser. No. 635,586
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB



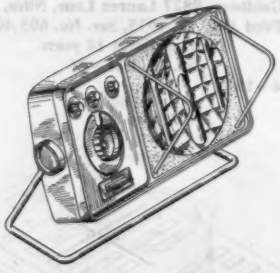
244,399
TOY SEWING MACHINE OR SIMILAR ARTICLE
P. W. Chiu, Hong Kong, Hong Kong, assignor to Durham Industries, Inc., New York, N.Y.
Filed May 29, 1975, Ser. No. 582,034
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15B



244,400
CURTAIN MATERIAL
Peter E. Schroeder, Am Falter 8, CH866, Lucerne, Switzerland
Filed Sept. 29, 1975, Ser. No. 617,676
Claims priority, application Germany, May 13, 1975, 289/75
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 E



244,401
SUN LAMP
William J. Rakocy, Nutley, N.J., assignor to North American Philips Corporation, New York, N.Y.
Filed July 31, 1975, Ser. No. 600,843
Term of patent 14 years
Int. Cl. D26—*99*
U.S. Cl. D48—20 H



244,402

BEVERAGE VENDING MACHINE

Stephen Less, London; Stanley Leight, Finchley, and Peter Abbey, Marlow, all of England, assignors to Wine-a-matic Limited, Finchley, England

Filed Apr. 21, 1975, Ser. No. 570,177

Claims priority, application United Kingdom, Nov. 22, 1974, 968808/74

Term of patent 14 years

Int. Cl. D20—*01*

U.S. Cl. D52—3 R

244,403

DETACHABLE AND ADJUSTABLE URINAL

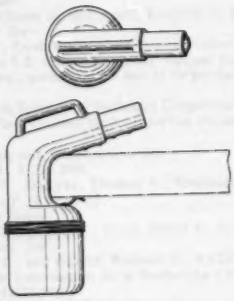
Ann G. DeAngelis, 510 Castle Drive, Bethel Park, Pa. 15102

Filed Sept. 27, 1974, Ser. No. 510,045

Term of patent 14 years

Int. Cl. D24—*04*

U.S. Cl. D24—54



244,404

PURSE OR SIMILAR ARTICLE

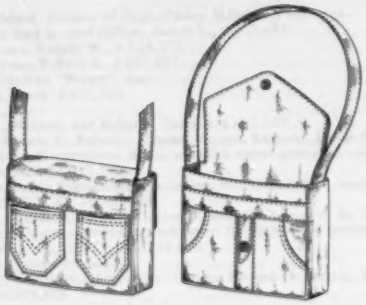
Flora May Gaylor, 10759 E. Admiral Place, Tulsa, Okla. 74467

Filed Sept. 24, 1975, Ser. No. 616,179

Term of patent 14 years

Int. Cl. D3—*01*

U.S. Cl. D87—3 C



244,405

CAMERA CASE

Yoshiro Takata, 18-3-5075, 1-chome, Matsugaoka, Takatsuki, Osaka, and Keiji Takechi, 25-12, Takeda-Okenoi, Fushimi, Kyoto, both of Japan

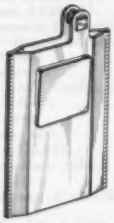
Filed Dec. 5, 1975, Ser. No. 638,007

Claims priority, application Japan, June 24, 1975, 50-26781

Term of patent 14 years

Int. Cl. D3—*02*

U.S. Cl. D87—5 E



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 17TH DAY OF MAY, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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A B Hammars Mekanisha Verkstad: *See—*
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A. C. Cars Limited: *See—*
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A. E. Strauss Company, Incorporated: *See—*
Strauss, Albert E., 4,024,211.

A.P. Products Incorporated: *See—*
Braund, Kenneth W.; and Venaleck, John T., 4,023,879.

AB Ferrosan: *See—*
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AB Nike Hydraulik: *See—*
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AB Volvo: *See—*
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Abe, Eiichi: *See—*
Usui, Keizaburo; Abe, Eiichi; and Ozaki, Kiyotaka, 4,023,443.

Abex Corporation: *See—*
Sierk, Raymond H., 4,023,658.

Abolins, Visvaldis; and Holub, Fred F., to General Electric Company. Flame retardant polyphenylene ether resin compositions containing a halogenated flame retardant and selected organic iron salts. 4,024,093, Cl. 260-17.4SG.

Achenbach, Dieter; Joswig, Siegfried; and Kolb, Walter, to Wolf-Gerate GmbH. Power grass shears. 4,023,332, Cl. 56-16.900.

Ackermann, Hans: *See—*
Dussy, Paul; and Ackermann, Hans, 4,024,123.

Acoustical Design Incorporated: *See—*
Goldstein, Harold, 4,024,535.

Acton, Robert C.; and Sunday, Lester R., to Westinghouse Electric Corporation. Bottle boring apparatus. 4,023,451, Cl. 82-1.500.

Actus, Inc.: *See—*
Mueller, Anthony A.; Bao, Frank W.; Parker, Stephen D.; and Hummeldorf, James L., 4,024,395.

Acuff, Kenneth J.: *See—*
Stavropoulos, William S.; and Acuff, Kenneth J., 4,024,021.

Acushnet Company: *See—*
Jepson, John W.; Reid, Walter; and Brown, Robert A., 4,023,802.

Adams, Joseph H., to S.S. Adams Company. Optical illusion device for concealing an object, animal or the like to be produced. 4,023,794, Cl. 272-8.00M.

Adams, William H., to Syracuse Electronics Corporation Subsidiary of Pass & Seymour, Inc. Ground fault protective circuitry. 4,024,436, Cl. 361-45.000.

Addressograph Multigraph Corporation: *See—*
Koch, Robert M., 4,023,896.
Patzke, Robert C.; DeRyke, Thomas V.; Ernohazy, Stephen; and Oddo, Eugene P., 4,023,592.

Advent Corporation: *See—*
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Aeroquip Corporation: *See—*
Rogers, Russell L.; and Buseth, Richard A., 4,023,584.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Moreau, Rene, 4,023,783.

Agency of Industrial Science & Technology: *See—*
Kagawa, Hiroshi, 4,024,319.
Nakamura, Osamu; Kodama, Teruo; Ogino, Isao; and Miyake, Yoshizo, 4,024,036.
Ohta, Nobuto; Imamura, Juichi; and Matsuzaki, Takehiko, 4,024,180.

AGFA-Gevaert, A.G.: *See—*
Hellmig, Ehrhard; and Ranz, Erwin, 4,023,970.

AGFA-GEVAERT N.V.: *See—*
Vanassche, Willy Joseph; and Pattyn, Herman Alberik, 4,023,972.

Aida Engineering, Ltd.: *See—*
Ogihara, Susumu; and Tezuka, Yoshitomo, 4,023,738.

Aidlin, Joseph W.: *See—*
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Aileo, Jackson A.: *See—*
Frieder, Leonard P., Jr.; and Aileo, Jackson A., 4,023,209.

Aiple, John R.; Grushon, Harold N.; and Wisecup, David R., to Monarch Marking Systems, Inc. Pinning method and apparatus. 4,023,254, Cl. 29-432.100.

Ainin Seiki Kabushiki Kaisha: *See—*
Murakami, Noboru, 4,023,444.

Akerson, David Wallace, to Conwed Corporation. Non-combustible hardboard sheet. 4,024,014, Cl. 162-145.000.

Akron Standard, division of Eagle-Picher Industries, Inc.: *See—*
Bishop, Earl L.; and Giffels, James L., 4,023,685.
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Vanderzee, Robert S., 4,023,407.

Aktiengesellschaft "Weser": *See—*
Harms, Horst, 4,023,519.

Akzo N.V.: *See—*
Brahm, Helmut; and Schulze, Helmut, 4,024,307.

Albanese, Angelo P.; Palmieri, Chester A.; and Rattiner, David H., to Sperry Rand Corporation. Radar adaptive signal processor system. 4,024,541, Cl. 343-17.10R.

Alesi, John, Jr., to Formex Manufacturing, Inc. Transformer mounting pad. 4,023,755, Cl. 248-19.000.

Alexander, David John; and Gamadia, Rustom Kooverji, to Lever Brothers Company. Pressure pack valve for dispensing particulate materials. 4,023,710, Cl. 222-148.000.

Alexander, George F.: *See—*
Krolak, Ronald L.; Alexander, George F.; and Oestmann, Eldon D., 4,023,625.

Alexandrov, Alexander Minchev: *See—*
Enchev, Ivan Dimitrov; Ilel, Eliesser Persiado; Kunchev, Nikola Tzanov; Harizanov, Kiril Georgiev; Genevski, Vladimir Vetov; Draganov, Nedelcho Draganov; Haralampiev, Georgi Alexandrov; Smilenov, Todor Ivanov; Stoyanov, Yossif Genchev; and Alexandrov, Alexander Minchev, 4,024,035.

Alfa-Laval AB: *See—*
Olander, Karl Erik, 4,023,588.

Alfenaar, Marinus; and Jadoul, Desire J. N., to Stamicarbon B.V. Process for preparing cyanogen halides. 4,024,033, Cl. 204-59.00R.

Alke, Roger J.: *See—*
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Allard, Charles D.; and Allard, Eugene R. Patient controls holder. 4,023,757, Cl. 248-70.000.

Allard, Eugene R.: *See—*
Allard, Charles D.; and Allard, Eugene R., 4,023,757.

Allen, David A.: *See—*
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Allen & Hanburys Limited: *See—*
Ellis, Gwynn Pennant; Collins, Ian; Waters, David Martin; and Bays, David Edmund, 4,024,255.

Allen, John Graham, to Imperial Chemical Industries Limited. Method of preparing an N,N'-bis(p-cyanophenyl)-4,4'-bipyridylium salt. 4,024,150, Cl. 260-294.900.

Allied Chemical Corporation: *See—*
Dege, Gerald J.; and Liu, Kang-Jen, 4,024,043.
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Pez, Guido P., 4,024,169.

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Allport, Dennis Charlton: *See—*
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Allred, Gale F.: *See—*
Levinthal, Michael L.; Allred, Gale F.; and Poulter, Larry W., 4,023,935.

Alonso, Victor Manuel; Cialone, David Roy; Ducharme, George Romeo; and Ginnings, Paul Douglas, to International Business Machines Corporation. Liquid absorbing assembly with two porosities. 4,024,548, Cl. 346-140.00R.

Alpaugh, Warren Alan; and Summa, William Joseph, to International Business Machines Corporation. Method for producing a resin rich epoxy prepreg and laminate. 4,024,305, Cl. 427-381.000.

Alphen, Jacques M., to Cibie Projecteurs. Headlamp control systems. 4,024,387, Cl. 240-7.1LJ.

Althaus, Robert, to Aquametro AG. Fluid flow meter. 4,023,410, Cl. 73-229.000.

Aluminum Company of America: *See—*
Becker, Aaron J.; and Careatti, Don R., 4,024,221.

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Soles, Otto H.; and Alverson, Thomas E., 4,024,365.

Amacoil Machinery, Inc.: *See—*
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Amelio, Gilbert F.; and Gunsagar, Kamleshwar C., to Fairchild Camera and Instrument Corporation. Line-addressable random-access memory. 4,024,512, Cl. 340-173.0RC.

American Color & Chemical Corporation: *See—*
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American Cyanamid Company: *See—*
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American District Telegraph Company: *See—*
Galvin, Aaron A.; and Edson, James B., 4,024,519.

American Filtrona Corporation: *See—*
Lyon, Henry; and Byrne, Stanley William, 4,024,001.
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Bagli, Jehan F.; and Ferdinandi, Eckhardt, 4,024,156.
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American Motors Corporation: *See—*
DeRees, Delbert Duane, 4,023,856.
Amidon, Alan B.; and Mammino, Joseph, to Xerox Corporation. Photoelectrophoretic color imaging process in which back migration is eliminated. 4,023,968, Cl. 96-1.300.
Ammons, Vernon G., to PPG Industries, Inc. Polycarbonate polyurethanes based on particular aliphatic/cycloaliphatic polycarbonates. 4,024,113, Cl. 260-77.5AM.
AMP Incorporated: *See—*
Lerner, Lewis Brian, 4,024,031.
Raposa, Henry James; and Tennant, Robert John, 4,023,883.
Amsden, Donald L.; and Nowicki, Casimir W., to Owens-Illinois, Inc. Apparatus and method for welding a polyethylene sleeve label to a polyethylene bottle. 4,024,009, Cl. 156-272.000.
Anagnostidis, Marc, to Societe Metallurgique de Gerzat. Bottles for compressed gases of AU6MGT. 4,023,696, Cl. 220-3.000.
Analogic Corporation: *See—*
Neumann, Leopold, 4,024,533.
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Anderson, Anthony T.: *See—*
Stickels, Charles A.; Anderson, Anthony T.; and Janotik, Adam M., 4,023,988.
Anderson, Charles Merton, to Year-A-Round Cab Corporation. Floating sickle drive. 4,023,333, Cl. 56-296.000.
Anderson, Charles W., to Chromalloy American Corporation. Cultural implement with foldable tool supporting frame. 4,023,623, Cl. 172-311.000.
Anderson, Daniel J., to P. R. Mallory & Co., Inc. Capacitor and capacitor electrolyte. 4,024,442, Cl. 361-322.000.
Anderson, Freeman C.: *See—*
Houke, Howard F.; and Anderson, Freeman C., 4,023,983.
Anderson, John: *See—*
Pantridge, James Francis; and Anderson, John, 4,023,573.
Anderson, Roy: *See—*
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Andersson, Conny; and Lassander, Erik, to ASEA Aktiebolag. DC arc furnace and starting electrode construction. 4,024,337, Cl. 13-18.000.
Andersson, Leif Georg Lennart. Method and a device for character presentation. 4,024,536, Cl. 340-407.000.
Ando, Meiki: *See—*
Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; Kano, Saburo; and Nomura, Osami, 4,024,252.
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Andrew Corporation: *See—*
Andrews, Ray T., Jr., 4,023,769.
Andrews, Ray T., Jr., to Andrew Corporation. Molding means having opposed core assemblies. 4,023,769, Cl. 249-64.000.
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Ango, Alvino J. Load responsive variable stroke internal combustion engine. 4,023,542, Cl. 123-58.00R.
Annas, Dulin L.; and Teague, Richard M. Band saw grinder. 4,023,446, Cl. 76-40.000.
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Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Deep diode solid state transformer. 4,024,565, Cl. 357-51.000.
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Antos, George J., to UOP Inc. Hydrocarbon conversion with an acidic multimetallic catalytic composite. 4,024,052, Cl. 208-139.000.
Anzai, Nobuo; and Kato, Takao, to Mitsubishi Denki Kabushiki Kaisha. Brake for elevator. 4,023,655, Cl. 188-171.000.
Aoyama, Keiichi; Kaneko, Keeji; Muramatsu, Katsuji; and Fuutagawa, Ikuo, to Fuji Photo Film Co., Ltd. Film magazine having film speed indicating means. 4,024,557, Cl. 354-275.000.
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Applegate, Lyle C. Aerating means. 4,023,528, Cl. 119-5.000.
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Ikawa, Junzo; Aramaki, Tokuji; and Naitoh, Yasuo, 4,024,542.
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and di Marco, Aurelio, to Societa' Farmaceutici Italia S.p.A. 14-Aminodaunomycins, their preparation and use. 4,024,224, Cl. 424-180.000.
Archer, Robert A., to Eli Lilly and Company. Method of reducing elevated blood pressure with dihydroxy-hexahydrodibenzo(b,d)pyrans. 4,024,275, Cl. 424-283.000.
Archibald, John Leheup, to John Wyeth & Brother Limited. Heterocyclic compounds. 4,024,147, Cl. 260-293.690.
Arendale, William F., to Thiokol Corporation. Solid propellant containing ferrocene plasticizer. 4,023,994, Cl. 149-19.200.
Ariga, Keiji: *See—*
Nomura, Giichiro; Ando, Takuo; Ariga, Keiji; Ikeda, Akira; Saijo, Kinji; and Sato, Taizo, 4,023,987.
Armco Steel Corporation: *See—*
Bennett, Howard W.; and Lambert, Orand L., 4,023,676.
Arnold, Bruce Edward, to Singer Company, The. Dual voltage electromechanical clutch brake control system. 4,023,659, Cl. 192-12.00D.
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., to Goodyear Aerospace Corporation. Battery condition monitoring method and apparatus. 4,024,523, Cl. 340-249.000.
Arns, Harold E.: *See—*
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Aryamane, Avinash: *See—*
Schmidt, John, Jr.; and Aryamane, Avinash, 4,023,264.
Aryamane, Avinash P., to Littelfuse, Inc. Method of making a miniature plug-in fuse. 4,023,265, Cl. 29-623.000.
Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; Kano, Saburo; and Nomura, Osami, to Nippon Soda Company Limited. 2-(5-Ethyl-6-bromothiazolo[3,2-b]-5-triazolyl)thiophosphonate esters, compositions and method of use. 4,024,252, Cl. 424-200.000.
Asai, Osamu: *See—*
Hanazono, Masanobu; Asai, Osamu; and Tamura, Katsumi, 4,024,041.
ASEA Aktiebolag: *See—*
Andersson, Conny; and Lassander, Erik, 4,024,337.
Ekstrom, Ake; and Juhlin, Lars-Erik, 4,024,454.
Ashby, Rodney Roberts Rayner, to National Research Development Corporation. Display devices. 4,024,531, Cl. 340-334.000.
Ashmus, Donald Harold; Rankin, William Wirt; and Walter, Andrew Tainter, to Union Carbide Corporation. Apparatus for application of foam to a substrate. 4,023,526, Cl. 118-410.000.
Aspro, Incorporated: *See—*
Sproul, Nolte V.; and Kark, Michael F., 4,023,250.
Astbury, James Harry: *See—*
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Atlantic Richfield Company: *See—*
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Hudgin, Donald E., 4,024,326.
Russell, Donald Henry; and Lenton, Robert Warren, 4,024,104.
Atomic Energy of Canada Limited: *See—*
Ross, Alan Malcolm, 4,023,992.
Atwood, Jerry L., to University of Alabama, The. Liquid clathrates. 4,024,170, Cl. 260-438.50R.
Aussem, Rudolf: *See—*
Naumann, Wilhelm; Littmann, Wolfgang; and Aussem, Rudolf, 4,023,311.
Austin, Carl F.; Halsey, Carl C.; and Kendall, Samuel E., to United States of America, Navy. Fireline detonator. 4,023,493, Cl. 102-22.00R.
Austin, Kenneth L.: *See—*
Smock, George E.; Brock, Gregory C., Jr.; Hill, Homer G.; and Austin, Kenneth L., 4,024,304.
Automaticon A/S: *See—*
Jensen, Ole Roger; and Kobbero, Preben, 4,023,607.
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Burnett, James E., 4,024,446.
Auyang, John H. C.: *See—*
Drew, Bernard, Jr.; and Auyang, John H. C., 4,024,053.
Axelsson, Hans Inge Bengt, to Stiga AB. Steering gear. 4,023,434, Cl. 74-496.000.
Azuma, Akira, to Yoshida Kogyo Kabushiki Kaisha. Dual-roller support for overhung doors. 4,023,236, Cl. 16-97.000.
Azuma, Akira; and Hirano, Kiyohide, to Yoshida Kogyo Kabushiki Kaisha. Sash having rail with adjusting device. 4,023,326, Cl. 52-217.000.
B. F. Goodrich Company, The: *See—*
Morningstar, Marion G.; and Kehe, Henry J., 4,024,330.
Witenhafer, Donald E.; Haehn, James B.; and Cohen, Louis, 4,024,301.
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Pierce, Paul, Jr., 4,023,837.
Baba, Keizo: *See—*
Nakayama, Osamu; and Baba, Keizo, 4,023,886.
Babej, Milos; Bartmann, Wilhelm; Beck, Gerhard; and Lerch, Ulrich,

to Hoechst Aktiengesellschaft. Analogues of prostanoic acids. 4,024,181, Cl. 260-514.00D.

Babej, Milos: *See—*
Druckrey, Eike; Knabe, Bernd; Lang, Hans-Jochen; Babej, Milos; and Muschaweck, Roman, 4,024,274.

Babiak, Ihor; and Klymciw, Ihor. Portable spray container device. 4,023,712, Cl. 222-175.000.

Bachler, Werner; Frank, Rudiger; Habermann, Helmut; and Brunet, Maurice, to Leybold-Heraeus GmbH & Co. KG; and Societe de Propulsion-S.E.P. Turbomolecular vacuum pump having a magnetic bearing-supported rotor. 4,023,920, Cl. 417-354.000.

Bachman, Charles W.; and Franklin, Benjamin S., to Honeywell Information Systems, Inc. Database instruction find serial. 4,024,508, Cl. 340-172.500.

Bachur, Gerald; and Richardson, George E., to Optical Associates, Incorporated. Radiation-sensitive control circuit for driving lamp at various power levels. 4,024,428, Cl. 315-151.000.

Backward, Lennie E. Rear quarter window louver panel. 4,023,309, Cl. 49-62.000.

Badagnani, Guido: *See—*
Mercurio, Luigi; and Badagnani, Guido, 4,024,503.

Badger, Algernon S.: *See—*
Mayne, William H.; Hawes, William S.; and Badger, Algernon S., 4,024,492.

Baer, Lewis E.; Williams, William A.; and Wright, Carroll G., to T. B. Wood's Sons Company. Variable speed sheave assemblies and method of producing. 4,023,247, Cl. 29-149.50R.

Baffo, Mariano; and Brine, William F., Jr., to Ty-Data, Inc. Automatic typewriter. 4,023,664, Cl. 197-19.000.

Bagley, William H., Jr. Deceleration-responsive passenger-restraining device for motor vehicles. 4,023,643, Cl. 180-103.00A.

Bagli, Jehan F.; and Ferdinandi, Eckhardt, to American Home Products Corporation. Thiophene ethanolamines. 4,024,156, Cl. 260-332.30R.

Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., to United States of America, Agriculture. 2-(2-Benzoxyethoxy)-ethyl-2-furoate. 4,024,164, Cl. 260-347.500.

Bailey, Paul F. Solar heating device. 4,023,555, Cl. 126-270.000.

Bajorek, Christopher Henry; Hempstead, Robert Douglas; Krongelb, Sol; and Mayadas, Ashok Frank, to International Business Machines Corporation. Magnetoresistive sandwich including sensor electrically parallel with electrical shunt and magnetic biasing layers. 4,024,489, Cl. 338-32.00R.

Baker Manufacturing Company: *See—*
Lien, Neil C., 4,023,699.

Baker, Thomas W. Thermopneumatic support device. 4,023,756, Cl. 248-59.000.

Bakken, Ronald J. Meter and amplifier circuit for measuring AC and DC signals. 4,024,471, Cl. 324-123.00R.

Ball Corporation: *See—*
Dean, Geoffrey J., 4,023,513.
Kwiatkowski, J. A., 4,024,524.

Ballard, Albert S.; Cooper, Roy G.; and Davis, Dwight E., to General Atomic Company. Method for making nuclear fuel rods. 4,024,209, Cl. 264-.500.

Ban, Itsuki; and Mochizuki, Kasunori. Magnetic sound recording and playing back apparatus. 4,024,580, Cl. 360-96.000.

Ban, Itsuki; Nozaki, Sumio; Kasuya, Takanori; Shinkado, Yukio; and Yano, Kanji, to Ban, Itsuki. Track change-over mechanism for a multi-channel tape. 4,024,582, Cl. 360-106.000.

Banner, Joseph. Alarm device for use in combination with window sash. 4,024,526, Cl. 340-274.00R.

Bao, Frank W.: *See—*
Mueller, Anthony A.; Bao, Frank W.; Parker, Stephen D.; and Hummeldorf, James L., 4,024,395.

Barak, Morton: *See—*
Winchell, Harry S.; Barak, Morton; and Van Fleet, Parmer, III, 4,024,233.

Barber-Colman Company: *See—*
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Barker, Aldro J. Combination arm rest. 4,023,873, Cl. 312-235.00A.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See—*
Schippers, Heinz, 4,023,743.

Barnard, John K.: *See—*
Clark, David C.; Silverman, Louis H.; and Barnard, John K., 4,024,047.

Barnes, Alan Charles; Hairsine, Peter Wilfred; Ramm, Peter John; and Taylor, John Bodenham, to Roussel-UCLAF. Xanthone-2-carboxylic acid compounds. 4,024,276, Cl. 424-283.000.

Barnes, Edgar E.: *See—*
Owens, Malcolm P.; and Barnes, Edgar E., 4,023,742.

Barnes Engineering Company: *See—*
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Barnes, Sidney, to United Kingdom Atomic Energy Authority. Liquid metal cooled fast breeder nuclear reactors. 4,024,018, Cl. 176-30.000.

Barooshian, Charles T.: *See—*
Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., 4,024,576.

Barr, Jack R.: *See—*
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Barshtak, Natan Mironovich: *See—*
Kats, Arnold Yakovlevich; Dubosarsky, Georgy Pavlovich; Zakhvatkin, Dmitry Pavlovich; Burda, Iosif Kharitonovich; Mezentsev, Sergei Afanasievich; Barshtak, Natan Mironovich; and Chernykh, Jury Vladimirovich, 4,023,594.

Bartky, Walter Scott: *See—*
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Bartmann, Wilhelm: *See—*
Babej, Milos; Bartmann, Wilhelm; Beck, Gerhard; and Lerch, Ulrich, 4,024,181.

Barton, Leslie W.; and Smith, Don H., to Tyler Holding Company. Explosive container. 4,023,494, Cl. 102-24.00R.

Barton, Lucian Anthony: *See—*
Ross, Daniel Louis; and Barton, Lucian Anthony, 4,024,122.

BASF Aktiengesellschaft: *See—*
Burdorf, Donald L.; Rotter, Gerhard; and Arns, Harold E., 4,023,748.
Diefenbach, Horst; and Platt, Karl-Ludwig, 4,024,327.
Horn, Peter; and Haertl, Hans-Dietmar, 4,024,116.
Schlichting, Karl; Beer, Ludwig; and Seydl, Wolfgang, 4,024,204.
Zahn, Erwin; Cordes, Claus; Simon, Georg Nikolaus; and Weiss, Hans-Peter, 4,024,115.

BASF Wyandotte Corporation: *See—*
Login, Robert Bernard, 4,024,112.
Login, Robert Bernard, 4,024,205.

Bastian, Jean-Michel, to Sandoz Ltd. Benzo[5,6]cyclohepta[1,2-c]pyridines. 4,024,265, Cl. 424-267.000.

Bastian, Jean-Michel, to Sandoz Ltd. 4H-Benzo[4,5]cyclohepta[1,2-b]thiophenes. 4,024,266, Cl. 424-267.000.

Bates, Harold M.: *See—*
Reisner, David B.; Ludwig, Bernard J.; Bates, Harold M.; and Berger, Frank M., 4,024,139.

Batts, John H.; and Duester, Everett L., to John Thomas Batts, Inc. Article suspension device. 4,023,762, Cl. 248-359.000.

Bauer, Victor John; Martin, Lawrence Leo; and Duffy, Brian John, to American Hoechst Corporation. 3-Anilino-2,4-diazabicyclo[3.2.-1]octenes. 4,024,259, Cl. 424-251.000.

Bauer, Victor John: *See—*
Klioze, Solomon Samuel; and Bauer, Victor John, 4,024,263.

Bauer, William C.; and Howard, Richard Irving, deceased (by Howard, Kate Johnson, executrix), to FMC Corporation. Manufacture of glass using briquettes. 4,023,976, Cl. 106-52.000.

Bauersfeld, Edward J.: *See—*
Levinstein, Moses A.; and Bauersfeld, Edward J., 4,023,252.

Baughn, Charles O.; Linkenheimer, Wayne H.; and Brown, William E., to E. R. Squibb & Sons, Inc. Use of ampicillin for the treatment of swine dysentery. 4,024,268, Cl. 424-271.000.

Baumgartner, Kenneth A.; and Bivens, Ward L., to Towmotor Corporation. Brush wear indicator. 4,024,525, Cl. 340-267.00R.

Bayer Aktiengesellschaft: *See—*
Becker, Wolf-Jurgen; and Magerkorth, Werner, 4,023,709.
Becker, Wolf-Jurgen; and Schreckling, Kurt, 4,023,929.
Groll, Manfred; Hederich, Volker; and Bien, Hans-Samuel, 4,024,144.
Guth, Hans; Jonas, Gerhard; Kleine-Weischede, Klaus; Wieschen, Hermann; Kaiser, Hans-Joachim; Dorr, Karl-Heinz; and Grimm, Hugo, 4,023,938.
Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, 4,024,176.
Kuhn, Peter; Raichle, Karl; Kuchenmeister, Rolf; and Peltzer, Bernd, 4,024,100.
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,024,261.
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,023,958.
Sommer, Richard; and Wolfrum, Gerhard, 4,024,126.
von Bonin, Wulf; Kleimann, Helmut; and Post, Udo, 4,024,090.
Wenzelburger, Jurgen; Buchel, Karl Heinz; Piempel, Manfred; and Meiser, Werner, 4,024,270.
Widdig, Arno; Kuhle, Engelbert; Thomas, Herbert; and Schulz, Hans Peter, 4,024,236.

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Bays, David Edmund: *See—*
Ellis, Gwynn Pennant; Collins, Ian; Waters, David Martin; and Bays, David Edmund, 4,024,255.

Beales, Keith John: *See—*
Newns, George Reginald; and Beales, Keith John, 4,023,952.

Bean, Rufus C.: *See—*
Papsco, William G.; Cohn, Harry, Jr.; and Bean, Rufus C., 4,023,686.

Beane, Bennie J., to General Electric Company. Filter unit. 4,023,944, Cl. 55-481.000.

Beasley, T. James, to Lockheed Aircraft Corporation. Method and system for navigation employing incremental range difference. 4,024,383, Cl. 235-150.270.

Beattie, David Hepburn, to Clarke Chapman Limited. Apparatus for recovering rope and chain cable. 4,023,775, Cl. 254-190.00R.

Beck, Charles E.: *See—*
Haug, Edward W.; and Beck, Charles E., 4,023,246.

Beck, Gerhard: *See—*
Babej, Milos; Bartmann, Wilhelm; Beck, Gerhard; and Lerch, Ulrich, 4,024,181.

Becker, Aaron J.; and Careatti, Don R., to Aluminum Company of America. Low temperature method of producing boron trichloride in a molten bath. 4,024,221, Cl. 423-292.000.

Becker, Wolf-Jurgen; and Magerkorth, Werner, to Bayer Aktiengesellschaft. Apparatus for dosing a constant quantity of fluid into an analysis device. 4,023,709, Cl. 222-70.000.

Becker, Wolf-Jurgen; and Schreckling, Kurt, to Bayer Aktiengesellschaft. Process for determining traces of mercury in liquids. 4,023,929, Cl. 23-230.0PC.

Beckmann, Oskar, to Siemens Aktiengesellschaft. Circuit arrangement for wireless transmission of a control signal to the control path or a controllable semiconductor valve, in particular a thyristor. 4,024,474, Cl. 325-37.000.

Becwar, Andrew J.: *See*—
Schlom, Leslie A.; Dubey, Michael B.; and Becwar, Andrew J., 4,023,949.

Beecham Group Limited: *See*—
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Beer, Ludwig: *See*—
Schlichting, Karl; Beer, Ludwig; and Seydl, Wolfgang, 4,024,204.

Beery, Jack, to Burroughs Corporation. Document endorsing control circuitry and method for minimizing power consumption requirements. 4,023,489, Cl. 101-235.000.

Beier, Edmar, to Volkswagenwerk Aktiengesellschaft. Apparatus for tensioning a safety belt. 4,023,427, Cl. 74-242.1FP.

Belhomme, Charles, to U.S. Philips Corporation. Degaussing circuit. 4,024,427, Cl. 315-8.000.

Bell & Howell Company: *See*—
Scheib, Harold A., 4,023,903.

Bell Telephone Laboratories, Incorporated: *See*—
Carlson, Eric Robert; Penzias, Arno Allan; and Schneider, Martin Victor, 4,023,258.
Ingle, Edwin Coy, 4,024,351.
Julesz, Bela; Kerns, Becky Thomas; and Terry, Milton Everett, 4,023,911.
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Bellmann, Bernhard: *See*—
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Beloy, Francis J., to Caterpillar Tractor Co. Fibrous concrete mixing system. 4,023,779, Cl. 259-165.000.

Bendix Corporation, The: *See*—
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Bengoa, Jose' E. Apparatus for conserving electrical energy. 4,024,411, Cl. 307-41.000.

Benkoe, Erwin: *See*—
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,023,524.

Bennett, David Alexander, to Sperry Rand Corporation. Ship stabilizing systems. 4,023,516, Cl. 114-126.000.

Bennett, Howard W.; and Lambert, Orand L., to Armco Steel Corporation. Lance structure and method for oxygen refining of molten metal. 4,023,676, Cl. 266-222.000.

Bennett, James Gordy, Jr.; and Cooper, Glenn Dale, to General Electric Company. Method of separating a copper-amine catalyst from a polyphenylene ether reaction mixture. 4,024,107, Cl. 260-47.0ET.

Bennett, Wilbur G., to J. I. Case Company. Log grapple. 4,023,848, Cl. 294-88.000.

Benninger, Siegfried; and Martini, Thomas, to Hoechst Aktiengesellschaft. Perfluorocyclohexyl ethers. 4,024,192, Cl. 260-611.00R.

Benz, John W., Jr., to Standard Pressed Steel Co. Tightening system with torque-time control. 4,023,406, Cl. 73-139.000.

Berardinelli, Frank M.: *See*—
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Berg, Bengt Artur: *See*—
Hellstrom, Nils Erik; and Berg, Bengt Artur, 4,023,605.

Berger, Frank M.: *See*—
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Bergmann, Rolf: *See*—
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Bergwerksverband GmbH: *See*—
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Juntgen, Harald; Knoblauch, Karl; Grochowski, Horst; and Schwarte, Jurgen, 4,023,939.

Berkling, Klaus; and Kluge, Werner, to Gesellschaft fur Mathematik und Datenverarbeitung mbH, Bonn. Arrangement for monitoring the state of memory segments. 4,024,507, Cl. 340-172.500.

Berkopec, Frank D.: *See*—
Lovell, Robert R.; Berkopec, Frank D.; and Culp, David H., 4,023,266.

Berkowitz, Irving L., to Kason Hardware Corporation. Convertible tube connecting system. 4,023,913, Cl. 403-2.000.

Berlier, Richard Allen; and Brown, Augustus Boyd, to International Business Machines Corporation. Reversing lead screw construction. 4,023,421, Cl. 74-57.000.

Bernardi, Luigi: *See*—
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Bernstein, Stanley; Lambert, Thomas W.; Griswa, Philip J.; and Stagg, Lucius, to General Electric Company. X-ray apparatus. 4,024,401, Cl. 250-439.00R.

Bernstein, Stanley; Griswa, Philip J.; Halter, Paul, Jr.; and Kidd, Harold J., to General Electric Company. X-ray cardiovascular examination apparatus. 4,024,403, Cl. 250-445.00R.

Berrey, Harry R., to General Electric Company. Type finger improvement. 4,023,483, Cl. 101-111.000.

Bertini, Milo. Method of making a saw blade construction. 4,023,448, Cl. 76-112.000.

Bertoglio, Ottavio, to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA. Method of and means for identifying temporarily coacting units in a telecommunication system. 4,024,361, Cl. 179-175.20C.

Bethlen, Farkas, to G. D. Searle & Co. Stretcher trolleys. 4,023,849, Cl. 296-20.000.

Bettger, Lloyd Erwin; and Jensen, Charles Albert. Building unit. 4,023,317, Cl. 52-204.000.

Bettis Corporation: *See*—
Pavlas, Garnet L., 4,023,431.

Betts, Robert E.; Thorn, Lawrence B.; and Maykut, Albert R., to United States of America, Army. Noise controllable nozzle closure. 4,023,356, Cl. 60-271.000.

Beuk, Jack F.; Warner, William D.; and Kang, Chunghee K., to Swift and Company Limited. Process for preparing plant protease solutions. 4,024,285, Cl. 426-2.000.

Bevilacqua, Frank, to Combustion Engineering, Inc. Spent fuel storage improvement. 4,024,406, Cl. 250-518.000.

Beyler, Roland Robert Charles; Caruel, Jacques Emile Jules; Pidebois, Jacques Eloi; Quillevere, Herve Alain; and Schenher, Michel Bernard, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Injecting and igniting device. 4,023,351, Cl. 60-39.74B.

Bharteey, Brij M.: *See*—
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Bhatia, Kamlesh K.: *See*—
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Bianchetta, Donald L., to Caterpillar Tractor Co. Swing flow supplemental travel for an excavator. 4,023,364, Cl. 60-421.000.

Bianchi, Massimo: *See*—
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Biasotti, Joseph B.: *See*—
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Bickel, Hans: *See*—
Muller, Beat; Peter, Heinrich; Schneider, Peter; and Bickel, Hans, 4,024,249.

Biehler, Jean-Marie J.; Lecolier, Serge L.; and Le Roy, Patrice M., to Societe Nationale des Poudres et Explosifs. Diethyl hydroxymethylphosphonate esters, their preparation and use. 4,024,207, Cl. 260-932.000.

Bien, Hans-Samuel: *See*—
Groll, Manfred; Hederich, Volker; and Bien, Hans-Samuel, 4,024,144.

Bienert, Horst; and Schatzler, Walter, to Webasto-Werk W. Baier KG. Crank and drive mechanism for a raisable sliding top of a motor vehicle. 4,023,858, Cl. 296-137.00G.

Biggers, Howard O.: *See*—
Buzzella, Robert W.; and Biggers, Howard O., 4,023,582.

Billi, S.p.A.: *See*—
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Billings, John S., Jr.: *See*—
Meyer, Jeffry R.; and Billings, John S., Jr., 4,024,339.

Bindra, Jasjit S.; and Johnson, Michael R., to Pfizer Inc. Substituted ω-pentanorprostaglandins. 4,024,179, Cl. 260-473.00A.

Biondetti, Mario, to Escher Wyss Limited. Apparatus for controlling a deflection compensating press roll of a rolling mill. 4,023,480, Cl. 100-47.000.

Biondo, Joseph G., to Engelhard Minerals & Chemicals Corporation. Measuring and dispensing device. 4,023,715, Cl. 222-307.000.

Biraghi, Giorgio; and Manghi, Carlo Alberto, to Societa Italiana Telecomunicazioni Siemens S.p.A. Station checking network for telecommunication system. 4,024,360, Cl. 179-175.30R.

Bird & Son, Inc.: *See*—
Jackson, James W., 4,023,320.

Birkle, Hans Gerhard; and Krebitz, Josef, to Metzeler Kautschuk AG. Torsional vibration damper. 4,023,438, Cl. 74-574.000.

Bisbing, Robert H., to Southco, Inc. Push button latch. 4,023,839, Cl. 292-85.000.

Bishop, Earl L.; and Giffels, James L., to Akron Standard, division of Eagle-Picher Industries, Inc. Billet manipulator. 4,023,685, Cl. 214-1.0QG.

Bishop, Edmund; and Wright, David Timothy, to National Research Development Corporation. Oxidation of cyanides. 4,024,037, Cl. 204-149.000.

Bishop, Walton B., to United States of America, Navy. Electronic file and record keeper for secondary radar targets. 4,024,538, Cl. 343-6.5LC.

Bison-werke Bahre & Greten GmbH & Co. KG: *See*—
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Biss, A. Albert. Gas cleaning device for controlling air pollution from the charging ports of a by-product coke oven and for obtaining superior quality by-products. 4,024,025, Cl. 202-263.000.

Bivens, Ward L.: *See*—
Baumgartner, Kenneth A.; and Bivens, Ward L., 4,024,525.

Bjork, Anders Karl Konrad; Hernestam, Sven Erik Harry; and Kjellberg, Bengt Erik Sigvard, to AB Ferrosan. Diphenylbutylpiperidines. 4,024,264, Cl. 424-267.000.

Black and Decker Manufacturing Company, The: *See*—
Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, 4,023,552.

Blagrave, Theodore W.: *See*—
Ruppel, Raymond A.; Fagle, Joseph Z.; and Blagrave, Theodore W., 4,024,497.

Blair, Walter A.: *See*—
Fortini, Jack G.; Blair, Walter A.; and Grodsky, Gerold M., 4,024,247.

Blann, William Arthur, to Globe-Union Inc. Method of reducing lead and acid waste contamination in battery plant operation. 4,024,055, Cl. 210-45.000.

Blaupunkt-Werke GmbH: *See*—
Bragas, Peter; and Matzold, Uwe, 4,024,475.
Diethelm, Otto, 4,024,577.

Bleh, Otto: *See*—
Lenz, Arnold; Bleh, Otto; and von Metnitz, Harald, 4,024,173.

Blight, Alison M.: *See*—
Blight, Langdon R., 4,023,229.

Blight, Langdon R., to Blight, Alison M. Printing plate washing apparatus. 4,023,229, Cl. 15-77.000.

Blind, Andre; and Linares, Hubert, to Rhone-Poulenc S.A. Process for the preparation of 5-alkyl-10-amino-dihydrodibenzoazepines. 4,024,127, Cl. 260-239.00D.

Blue Cross Laboratories, Inc.: *See*—
Mahler, Darrell G.; and Doumani, Charles, 4,023,912.

Blunck, Otto; Seim, Burkhart; Retzow, Karl-Heinz; and Zorner, Karl-Heinz, to Maihak AG. Method and apparatus for determining the concentration of a gas or gases in a gas mixture by sensing the coloration undergone by reagent test paper, or the like, in response to exposure to such gas or gases. 4,023,930, Cl. 23-232.00R.

Blytas, George C.; and Curtis, Richard M., to Shell Oil Company. Monitoring metals concentration in fluid streams. 4,024,400, Cl. 250-432.00R.

BMR Security Products Corporation: *See*—
Walters, Russell W., 4,023,386.

Boaz, Premakaran T., to Ford Motor Company. Method of tempering glass having openings therethrough. 4,023,945, Cl. 65-112.000.

Bobulski, Henry Alan, to Production Measurements Corporation. Apparatus for measuring spark plug gap spacing. 4,024,469, Cl. 324-16.00R.

Boccia, Salvatore, to Minigrip, Inc. Open profile bag. 4,024,010, Cl. 156-290.000.

Bodine, Albert G. Drilling device utilizing sonic resonant torsional rectifier. 4,023,628, Cl. 175-56.000.

Bodtcher-Hansen, Henrik: *See*—
Olesen, Kaj Sigard; and Bodtcher-Hansen, Henrik, 4,024,375.

Boeing Company, The: *See*—
Cowan, Samuel Joseph; and Little, John William, 4,023,644.

Boekhorst, Antonius, to U.S. Philips Corporation. Circuit arrangement in an image display apparatus for (horizontal) line deflection. 4,024,432, Cl. 315-371.000.

Boggs, Luther M.; and Boyles, Richard Q. Remote switching system. 4,024,528, Cl. 340-310.00A.

Bolex International SA: *See*—
Niederhauser, Marc; and Huguenot, Pierre, 4,023,910.

Bolick, Fred C., Jr.; Titus, Theodore, IV; and Mohammadioun, Said, to Lanier Business Products, Inc. Cassette central dictation system. 4,024,354, Cl. 179-100.1DR.

Bombardier Limited: *See*—
Morissette, Roger, 4,023,865.

Bone, Arthur George, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Altimeters. 4,023,414, Cl. 73-387.000.

Bonnaure, Edouard, to Creusot-Loire Entreprises. Process for the direct reduction of minerals on a continuous grate. 4,023,963, Cl. 75-35.000.

Bonzano, Giorgio: *See*—
Lesca, Piercarlo; and Bonzano, Giorgio, 4,024,581.

Booth, Raymond E., to Sam Stein Associates, Inc. Tumble batter and breader machine. 4,023,521, Cl. 118-16.000.

Borup, Jorgen, to AB Nike Hydraulik. Vehicle alignment apparatus. 4,023,394, Cl. 72-457.000.

Bosboom, Wim: *See*—
Joosten, Louis Gerardus Josephus; Bosboom, Wim; Hetterscheid, Wilhelmus Theodorus Hendrikus; and Van Schaik, Gerrit Pieter Johannes, 4,024,434.

Bose, Arun C.: *See*—
Buckholtz, Harry E.; and Bose, Arun C., 4,024,198.

Bosscher, Jack F., to Oto-Data, Inc. Audiometric system. 4,024,499, Cl. 340-146.200.

Bosserman, David A.; and Freeman, Charles F., to United States of America, Army. Two microchannel plate picture element array image intensifier tube and system. 4,024,390, Cl. 250-213.0VT.

Bosserman, David A.; and Freeman, Charles F., to United States of America, Army. Photocathode and microchannel plate picture element array image intensifier tube and system. 4,024,391, Cl. 250-213.0VT.

Bossert, Friedrich: *See*—
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,024,261.

Boston, William Thomas, to Optronics International, Inc. Method and apparatus for position referencing the rotating drum of a scanner/-plotter. 4,024,518, Cl. 340-206.000.

Bothe, Rolf: *See*—
Seidel, Horst; Dahlmann, Horst; Bothe, Rolf; and Schmidt, Hermann, 4,023,960.

Bott, Edward A.: *See*—
Matalonis, Charles V.; and Bott, Edward A., 4,023,827.

Boudreaux, Gordon J.: *See*—
Bailey, August V.; Boudreaux, Gordon J.; Sumrell, Gene; and Novak, Arthur F., 4,024,164.

Bowyer, John M.: *See*—
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., 4,024,523.

Boyadjieff, George I., to Varco International, Inc. Tool for connecting and disconnecting well pipe. 4,023,449, Cl. 81-57.160.

Boyd, David M., to UOP Inc. Fractionation heat balance control system. 4,024,027, Cl. 203-2.000.

Boyden, Robert E. Power driven typewriter. 4,023,665, Cl. 197-55.000.

Boyles, Richard Q.: *See*—
Boggs, Luther M.; and Boyles, Richard Q., 4,024,528.

Bradford, Marion M.; and Williams, William L., to University of Georgia, The. Protein-assay reagent and method. 4,023,933, Cl. 23-230.00B.

Bradshaw, Janice: *See*—
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 4,024,133.
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 4,024,137.

Brady, Jack D.; and Legatski, Lester K., to FMC Corporation. Variable throat venturi scrubber. 4,023,942, Cl. 55-241.000.

Bragas, Peter; and Matzold, Uwe, to Blaupunkt-Werke GmbH. Decoder for frequency-modulated tones of two different lengths. 4,024,475, Cl. 325-55.000.

Brahm, Helmut; and Schulze, Helmut, to Akzo N.V. Polyurethane solutions. 4,024,307, Cl. 428-262.000.

Brandolino, Sandro A. Bass drum beater. 4,023,461, Cl. 84-422.00S.

Brandt, Henry William, Jr.: *See*—
Sorlie, Donald Thomas; Brandt, Henry William, Jr.; and Hitzhusen, Thomas E., 4,023,510.

Brannan, James R.; and Malkin, Irving, to Diamond Shamrock Corporation. Electrolysis cathodes bearing a melt-sprayed and leached nickel or cobalt coating. 4,024,044, Cl. 204-242.000.

Bratro, Frederick E.: *See*—
Hennessey, William M.; Caras, Bernard; Steckowich, John, Jr.; and Bratro, Frederick E., 4,023,877.

Braun, Hartmut; Riffel, Fritz; and Hartung, Walter, to Gesellschaft fur Kernforschung m.b.H. Apparatus for analyzing free-flowing material. 4,024,393, Cl. 250-303.000.

Braund, Kenneth W.; and Venaleck, John T., to A.P. Products Incorporated. Adjustable electrical connector with replaceable contact sub-assembly and variable strain relief. 4,023,879, Cl. 339-31.00R.

Brearley Company, The: *See*—
Provi, Mike A.; and Guinter, S. Robert, 4,023,634.

Breeze, Eric G.: *See*—
Pfost, R. Fred; and Breeze, Eric G., 4,024,379.

Brendel, Albert E., to Lebow Associates, Inc. Force measuring apparatus. 4,023,404, Cl. 73-133.00R.

Brenner, L. Martin; Petta, John M.; and Ross, Stephen T., to Smith-Kline Corporation. Coronary vasodilator and anti-anginal compositions comprising substituted benzofurans and benzothiophenes and methods of producing coronary vasodilation and anti-anginal activity. 4,024,273, Cl. 424-275.000.

Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. (Carbamoyl)pyridino derivatives of ureidocephalosporins. 4,024,135, Cl. 260-243.00C.

Briggs, George Roland, to RCA Corporation. Programmable frequency divider for a television receiver frequency synthesizer. 4,024,476, Cl. 325-421.000.

Briggs & Stratton Corporation: *See*—
Houston, George F., 4,023,550.

Brill, Klaus; Traub, Eberhard; Ortlieb, Alfred; Grothe, Wolfgang; and Scholl, Friedrich, to Robert Bosch G.m.b.H. Metal-coated carrier for recordings and process for determining the oxygen-attached aluminum contents in the coating. 4,024,546, Cl. 346-135.000.

Brine, William F., Jr.: *See*—
Baffo, Mariano; and Brine, William F., Jr., 4,023,664.

Bristol-Myers Company: *See*—
Partyka, Richard Anthony; Gordon, Maxwell; Kametani, Tetsuji; and Kigasawa, Kazuo (said Richard Anthony Partyka and Maxwell Gordon assors. to), 4,024,082.

British Hydromechanics Research Association, The: *See*—
Miller, Donald Stuart, 4,023,941.

British Steel Corporation: *See*—
Hughes, Lionel S., 4,023,322.

Brock, Gregory C., Jr.: *See*—
Smock, George E.; Brock, Gregory C., Jr.; Hill, Homer G.; and Austin, Kenneth L., 4,024,304.

Broecker, Bernhard; and Schardt, Richard, to Hoechst Aktiengesellschaft. Process for the manufacture of heat-curable synthetic resin which can be diluted with water and are suitable for the electrophoretic coating process. 4,024,095, Cl. 260-23.70A.

Broomfield, John, to Amacoil Machinery, Inc. Bobbin terminator. 4,023,740, Cl. 242-7.170.

Brotzmann, Karl; Fassbinder, Hans Georg; Mantey, Paul Gerhard; Grapengiesser, Johann Claus; and Hansen, Alfred, to Eisenwerk-Gesellschaft Maximilianshutte mbH. Apparatus for batchwise feeding of powders or particles. 4,023,713, Cl. 222-193.000.

Broughton, Donald R.: *See*—
Russ, Karl J.; and Broughton, Donald R., 4,024,075.

Brown, Augustus Boyd: *See*—
Berlier, Richard Allen; and Brown, Augustus Boyd, 4,023,421.

Brown, Dale M.; Ghezzo, Mario; and Garfinkel, Marvin, to General

Electric Company. Radiation sensing and charge storage devices. 4,024,562, Cl. 357-23.000.
Brown-Minneapolis Tank & Fabricating Co.: *See*—
Parkinson, Lindley A., 4,023,583.
Brown, Richard E.; and Lustgarten, David M., to Warner-Lambert Company. Substituted 2-amino chromones and process for the preparation thereof. 4,024,160, Cl. 260-345.200.
Brown, Robert A.: *See*—
Jepson, John W.; Reid, Walter; and Brown, Robert A., 4,023,802.
Brown, William E.: *See*—
Baughn, Charles O.; Linkenheimer, Wayne H.; and Brown, William E., 4,024,268.
Bruetsch, Walter Ernest: *See*—
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Brunet, Maurice: *See*—
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Bruninghaus, Hans: *See*—
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Bryant Grinder Corporation: *See*—
Lovely, John W.; and Hobbs, Robert N., 4,023,310.
Bryant, Randolph, Jr., to Gulf Research & Development Company. Riser for an offshore platform. 4,023,371, Cl. 61-110.000.
Buchel, Karl Heinz: *See*—
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, 4,024,270.
Bucher, Robert, to Sulzer Brothers Limited. Jacquard lifting wire. 4,023,598, Cl. 139-59.000.
Buckholtz, Harry E.; and Bose, Arun C., to Hooker Chemicals & Plastics Corporation. Process for the chlorination of toluene. 4,024,198, Cl. 260-650.00R.
Buckley, Janette A.: *See*—
French, John Barry; Reid, Neil M.; and Buckley, Janette A., 4,023,398.
Buendia, Jean: *See*—
Martel, Jacques; Buendia, Jean; and Toromanoff, Edmond, 4,024,172.
Bugaut, Andree; and Laudon, Monique, to Societe Anonyme dite: L'Oreal. Diaminobenzoquinones in hair dye compositions. 4,023,926, Cl. 8-10.000.
Buhler, Harald, to Etablissements Lardenois. Blow-wave brush. 4,023,578, Cl. 132-9.000.
Buhler, Hugo, to Patax Trust Reg. Method of making pile fabrics with deformed pile-thread ends. 4,024,003, Cl. 156-148.000.
Buildinter A.G.: *See*—
Caro Roqueta, Eduardo, 4,023,242.
Bull, Rame W.: *See*—
Denov, Sam; Bull, Rame W.; and Bartky, Walter Scott, 4,023,462.
Bunda, Tsuchio: *See*—
Noguchi, Masaaki; Bunda, Tsuchio; Sumiyoshi, Masaharu; and Kondo, Yasuo, 4,023,539.
Bundy, Gordon L.; and Nelson, Norman A., to Upjohn Company, The. 11-Dioxy-cis-4,5-didehydro-PGF compounds. 4,024,167, Cl. 260-410.000.
Buonavita, Carlos Ernesto, to Burroughs Corporation. Power transistor switching circuit. 4,024,450, Cl. 321-2.000.
Buquet, Alain; and Doyen, Louis, to SCAL - Societe de Conditionnements en Aluminum; and Thimonnier S.A. Container for pressurized liquid having a non-rigid wall. 4,023,700, Cl. 220-63.00R.
Burda, Iosif Kharitonovich: *See*—
Kats, Arnold Yakovlevich; Dubosarsky, Georgy Pavlovich; Zakhvatkin, Dmitry Pavlovich; Burda, Iosif Kharitonovich; Mezentsev, Sergei Afanasievich; Barshtak, Natan Mironovich; and Chernykh, Jury Vladimirovich, 4,023,594.
Burdorf, Donald L.; Rotter, Gerhard; and Arns, Harold E., to BASF Aktiengesellschaft. Cassette loading and tape tensioning system. 4,023,748, Cl. 242-192.000.
Burg, Karlheinz: *See*—
Sextro, Gunter; Burg, Karlheinz; and Wolters, Ernst, 4,024,105.
Burgess, Ralph D., Jr., to Pillsbury Company, The. Dough proofing machine. 4,023,476, Cl. 99-468.000.
Burlington Industries, Inc.: *See*—
Hurd, Audrey Grant, 4,023,385.
Burnett, James E., to Automation Industries, Inc. Motor control. 4,024,446, Cl. 318-685.000.
Burnham, David Robert, to Imperial Chemical Industries Limited. Oligomerisation process. 4,024,202, Cl. 260-683.15D.
Burnham, Robert D.: *See*—
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Burov, Atanas Tzvetanov; Simidjieva, Penka Atanasova; Stoicheva, Rumyana Toteva; and Malinovski, Jordan Petrov, to Institute po Phisikohimia pri Bulgarska Akademia na Naukite. Radiation sensitive elements and photographic processes using the same. 4,024,030, Cl. 204-15.000.
Burr, Kit F.: *See*—
Kun, Leslie C.; and Burr, Kit F., 4,023,618.
Burrie, Peter H.; Dijstelbergen, Harmen H.; and Koreman, Cornelis W., to N.V. Nederlandse Gasunie. Intrinsically safe power source with plural conversions. 4,024,449, Cl. 321-2.000.
Burroughs Corporation: *See*—
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Butts, Earl E.: *See*—
Kennedy, Thomas E.; Butts, Earl E.; and Steelman, Melvin W., 4,023,378.
Buzzella, Robert W.; and Biggers, Howard O. Vented metal umbrella kit. 4,023,582, Cl. 135-20.00R.
Bykhovsky, David Grigorievich; and Medvedev, Alexandr Yakovlevich. Apparatus for plasma working of electrically-conductive materials and method of operating same. 4,024,373, Cl. 219-121.00P.
Bykowski, Michael J.: *See*—
Ewing, Lloyd; and Bykowski, Michael J., 4,023,834.
Ewing, Lloyd; and Bykowski, Michael J., 4,023,835.
Byrne, Stanley William: *See*—
Lyon, Henry; and Byrne, Stanley William, 4,024,001.
Cade, J. Robert; and Raulerson, James D. Female urinary device. 4,023,560, Cl. 128-2.00F.
Cadman, Russell O. Multipurpose tool kit and folding handle therefor. 4,023,221, Cl. 7-1.00R.
Cairati, Luciano; Trifiro', Ferruccio; and Villa, Pierluigi, to Societa' Italiana Resine S.I.R. S.p.A. Catalyst for the oxidation of methanol to formaldehyde and process for preparing the same. 4,024,074, Cl. 252-470.000.
Calderazzo, Fausto: *See*—
Dell'Amico, Daniela Belli; and Calderazzo, Fausto, 4,024,228.
Caldwell, Samuel I., to Caterpillar Tractor Co. Crossed axis tapered roller bearing assembly. 4,023,869, Cl. 308-214.000.
Calspan Corporation: *See*—
Duryea, George R., Jr., 4,023,426.
Calvert, Rodney K.; and Scott, Dale K., to Mead Corporation, The. Packaging machine. 4,023,328, Cl. 53-157.000.
Campau, Walter Joseph: *See*—
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Campbell, Jack B., to Eli Lilly and Company. Quinoxaline derivatives as immune regulants. 4,024,142, Cl. 260-250.00Q.
Campbell, Robert W.; and Yelton, Harold D., to Phillips Petroleum Company. p-Phenylene sulfide polymers. 4,024,118, Cl. 260-79.100.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See*—
Morris, Elias P.; and Christie, Fred A., 4,023,497.
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Canon Kabushiki Kaisha: *See*—
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Caras, Bernard: *See*—
Hennessey, William M.; Caras, Bernard; Steckowich, John, Jr.; and Bratro, Frederick E., 4,023,877.
Careatti, Don R.: *See*—
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Carew, Victor E. Mobile stacker with a work station thereon. 4,023,695, Cl. 214-674.000.
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Carlson, Eric Robert; Penzias, Arno Allan; and Schneider, Martin Victor, to Bell Telephone Laboratories, Incorporated. Method of manufacturing semiconductor diodes for use in millimeter-wave circuits. 4,023,258, Cl. 29-578.000.
Carlson, Jon R.; and Jackson, Robert G., to Continental Oil Company. Construction having integral circulatory system. 4,023,617, Cl. 165-169.000.
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Carter, J. Warne, Sr.; and Carter, J. Warne, Jr. Temperature control apparatus for a monotube boiler. 4,023,537, Cl. 122-479.00S.
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Palmer, Richard D.; Barr, Jack R.; and Hrodey, Thomas E., 4,023,851.
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Caudel, Edward R.; and Raymond, Joseph H., Jr., to Texas Instruments Incorporated. Electronic calculator or digital processor chip having test mode of operation. 4,024,386, Cl. 235-153.0AM.
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Cech, Bohuslav; Kaderabek, Evzen; and Hanslik, Tomas, to Ceskoslovenska akademie ved. Process for separating ceramics of uranium and plutonium from zirconium by hydriding and mixtures thereof. 4,024,068, Cl. 252-301.10R.
Cederberg, Kjell A.; Konicek, Jiri K.; and Malm, Hans R., to Perstorp AB. Method for the production of through holes in a laminate. 4,023,998, Cl. 156-630.000.
Celanese Corporation: *See—*
Forschirm, Alex S., 4,023,927.
Stackman, Robert W.; and Berardinelli, Frank M., 4,024,102.
Cense, Adriaan; and Van Straaten, Jan, to U.S. Philips Corporation. Circuit arrangement for synchronizing an output signal in accordance with a periodic pulsatory input signal. 4,024,343, Cl. 358-148.000.
Centre d'Etudes et de Recherches de l'Industrie des Liants Hydrauliques: *See—*
Meric, Jean-Paul; and Peltier, Raymond, 4,024,407.
Ceskoslovenska akademie ved: *See—*
Cech, Bohuslav; Kaderabek, Evzen; and Hanslik, Tomas, 4,024,068.
Chadwick, Curt H., to GTE Sylvania Incorporated. Adjustable mirror mount assembly. 4,023,891, Cl. 350-288.000.
Chalmers, William W., to Canadian Occidental Petroleum, Ltd. Sulfur pelletizing. 4,024,210, Cl. 264-11.000.
Champagne, Ralph R., to Rockwell International Corporation. Yarn package positioners for textile machines. 4,023,747, Cl. 242-130.000.
Chance, Britton. Flash photolysis split beam spectrophotometer. 4,023,905, Cl. 356-97.000.
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Chang, Sin Kung. Reflective drill guide. 4,023,907, Cl. 356-138.000.
Charbonneau, Larry F., to General Motors Corporation. Alkylene-linked aromatic polyimides. 4,024,108, Cl. 260-47.0CP.
Chase, Curtis L.; and Lovness, William R., to Minnesota Mining and Manufacturing Company. Coating process utilizing propelled particles. 4,024,295, Cl. 427-47.000.
Chauvier, Fernand Louis Oscar Joseph. Apparatus for cleaning submerged surfaces. 4,023,227, Cl. 15-1.700.
Chavee, Rene M., to Fabrique Nationale Herstal S.A. Fuse for rifle-grenade. 4,023,499, Cl. 102-76.00R.
Chemische Werke Huls Aktiengesellschaft: *See—*
Stoye, Dieter; Andrejewski, Werner; and Draxler, Adolf, 4,024,317.
Chen, Thomas T., to Rockwell International Corporation. Continuous data stream FIFO magnetic bubble domain shift register. 4,024,517, Cl. 340-174.0TF.
Chernykh, Jury Vladimirovich: *See—*
Kats, Arnold Yakovlevich; Dubosarsky, Georgy Pavlovich; Zakhvatkin, Dmitry Pavlovich; Burda, Iosif Kharitonovich; Mezentsev, Sergei Afanasievich; Barshtak, Natan Mironovich; and Chernykh, Jury Vladimirovich, 4,023,594.
Cherubim, Martin, to Deutsche Texaco Aktiengesellschaft. Process for preparing cured epoxide polymers. 4,024,109, Cl. 260-47.0EN.
Chesley, Ronald F.: *See—*
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,023,524.
Chevron Research Company: *See—*
Kobzina, John W., 4,024,141.
Chiang, Peter T., to United States Steel Corporation. Method of making high purity alkali metal phosphates from wet-process phosphoric acid. 4,024,225, Cl. 423-305.000.
Childs, S. A.: *See—*
Garcia, George E., 4,023,415.
Chin, Fay K.: *See—*
Clark, Robert N.; Prine, David W.; and Chin, Fay K., 4,024,522.
Chinai, Kays; and Ginocchio, James A., to Personal Products Company. Adhesively attached absorbent liners. 4,023,570, Cl. 128-290.00R.
Chinnappa, James C. V.; and Karran, David D., to University of Guyana, The. Water-ammonia refrigeration system using solar energy. 4,023,375, Cl. 62-2.000.
Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt.: *See—*
Toth, Geza; and Toth, Istvan, 4,024,269.
Chloride Silent Power Ltd.: *See—*
Gibson, John George; and Sudworth, James Lowe, 4,024,320.
Tilley, Alec R., 4,024,321.
Chowning, Patrick J.; Cikoski, Diane W.; and Cikoski, Thomas R., to Burroughs Corporation. Firmware loader for load time binding. 4,024,504, Cl. 340-172.500.
Christianson, Clinton C.; and Seider, Gene J., to Gould Inc. Electric vehicle battery charger. 4,024,448, Cl. 320-23.000.
Christie, Fred A.: *See—*
Morris, Elias P.; and Christie, Fred A., 4,023,497.
Chromalloy American Corporation: *See—*
Anderson, Charles W., 4,023,623.
Chrysler Corporation: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,024,483.
Tomczak, Lawrence William; Crall, Frederick William; Caron, La Verne Andrew; and Campau, Walter Joseph, 4,024,484.
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,024,485.
Cialone, David Roy: *See—*
Alonso, Victor Manuel; Cialone, David Roy; Ducharme, George Romeo; and Ginnings, Paul Douglas, 4,024,548.
Ciba-Geigy Corporation: *See—*
Fringeli, Werner, 4,024,071.
Grunder, Hans; and Setz, Walter, 4,023,472.
Habermeier, Juergen; and Porret, Daniel, 4,024,146.
L'Eplattenier, Francois; Pugin, Andre; and Vuitel, Laurent, 4,024,132.
Muller, Beat; Peter, Heinrich; Schneider, Peter; and Bickel, Hans, 4,024,249.
Skelly, James Kenneth; and Astbury, James Harry, 4,023,830.
Cibie Projecteurs: *See—*
Alphen, Jacques M., 4,024,387.
Cikoski, Diane W.: *See—*
Chowning, Patrick J.; Cikoski, Diane W.; and Cikoski, Thomas R., 4,024,504.
Cikoski, Thomas R.: *See—*
Chowning, Patrick J.; Cikoski, Diane W.; and Cikoski, Thomas R., 4,024,504.
Cincinnati Electronics Corporation: *See—*
Ofverberg, Mats Jorgen, 4,024,540.
Citizen Watch Co., Ltd.: *See—*
Fujita, Hiro; Morokawa, Shigeru; and Tsuzuki, Akira, 4,024,416.
Shirasu, Shinichi; and Nomura, Yasushi, 4,023,890.
Claasen, Antonius Bernardus. Packing for impression material for dental use. 4,023,675, Cl. 206-219.000.
Clapp, John Madison; and Pauley, Reginald William, to Ingersoll-Rand Company. Air shut-off tool. 4,023,627, Cl. 173-12.000.
Clark, David C.; Silverman, Louis H.; and Barnard, John K., to Progressive Equipment Corporation. Electrostatic water treatment apparatus. 4,024,047, Cl. 204-302.000.
Clark, Earl C.; and Lewis, William L., to Lewis, Mark. Trellis arm and support. 4,023,307, Cl. 47-46.000.
Clark Equipment Company: *See—*
Hancock, James E.; and Stuller, Howard E., 4,023,285.
Holmes, Donald E.; Howard, Wayne R.; Fisher, John F.; and Zeller, Burton S., 4,023,638.
Clark, Gary E. Tiltable vehicle loading ramp. 4,023,852, Cl. 296-61.000.
Clark, Robert N.; Prine, David W.; and Chin, Fay K., to Gard, Inc. Acoustic emission system for welding flaw detection. 4,024,522, Cl. 340-248.00W.
Clark, William D., to International Business Machines Corporation. Optics drive mechanism. 4,023,897, Cl. 355-8.000.
Clarke Chapman Limited: *See—*
Beattie, David Hepburn, 4,023,775.

Clarke, Peter Alec, to Molins Limited. Conveyor systems for cigarettes and the like. 4,023,669, Cl. 198-573.000.

Cleary, William I.: *See—*
Vild, Joseph P.; Cleary, William I.; and Fox, Donald P., 4,024,470.

Clemens, Kurt; Wollenweber, Kurt; Bruninghaus, Hans; and Nies, Konrad, to L. & C. Steinmuller GmbH. Method of welding pipes onto pressure conveying elements, especially pipe plates, pressure containers and collectors. 4,023,611, Cl. 164-69.000.

Clements, Arthur C. Apparatus for producing monolithic cast concrete structures. 4,023,764, Cl. 249-27.000.

Clementson, John Joseph; and Horvath, Arisztid Lajos, to Imperial Chemical Industries Limited. Azeotropic solvent composition for cleaning. 4,023,984, Cl. 134-38.000.

Cleveland Metal Abrasive, Inc.: *See—*
Dunkerley, Fred J.; Gaudino, Albert J.; and Vilyus, Robert P., 4,023,985.

Cline, Harvey E.: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 4,024,420.
Anthony, Thomas R.; and Cline, Harvey E., 4,024,565.
Anthony, Thomas R.; and Cline, Harvey E., 4,024,566.

Cloos, Erwin, to Die Firma Carl Cloos. Guide tube for an arc welding gun. 4,024,374, Cl. 219-130.000.

Coach & Car Equipment Corporation: *See—*
Harder, Arthur J., Jr., 4,023,860.

Cobb, N. A.: *See—*
Wickware, James L., 4,023,286.

Cobb, Richard H. Poultry cage bottom cover. 4,023,530, Cl. 119-17.000.

Cohen, Alfred. Reactor for analysis of polluted liquids. 4,023,932, Cl. 23-253.0PC.

Cohen, Louis: *See—*
Witenhafer, Donald E.; Haehn, James B.; and Cohen, Louis, 4,024,301.

Cohen, Seymour; Klar, Norman; and Schwartz, David, to Master Recessed Systems, Inc. Multipurpose structure for supporting drapery tracks, Venetian blinds, or the like. 4,023,235, Cl. 16-94.00D.

Cohn, Harry, Jr.: *See—*
Papsco, William G.; Cohn, Harry, Jr.; and Bean, Rufus C., 4,023,686.

Coilcraft, Inc.: *See—*
Priegnitz, Robert A., 4,024,438.

Colbert, Ervin A.; Mann, Richard J.; and Phillips, Robert W., to Symons Corporation. Repair sleeve for a marine pile and method of applying the same. 4,023,374, Cl. 61-54.000.

Cole, James D., to F. D. Farnum Co. Precombustion conditioning device for internal combustion engines. 4,023,544, Cl. 123-119.00E.

Colella, Donald F.; and Kaiser, Carl, to SmithKline Corporation. N,N-bis[2-(3-substituted-4-hydroxyphenyl)-ethyl or -2-hydroxyethyl]-polymethylenediamines. 4,024,281, Cl. 424-324.000.

Coleman, Donald F.; and Hoerr, Richard H., to Caterpillar Tractor Co. Minimum start timer for starting a diesel engine. 4,024,408, Cl. 290-37.00R.

Colgate-Palmolive Company: *See—*
Messina, Ralph Paul, 4,023,978.

Collins, Ian: *See—*
Ellis, Gwynn Pennant; Collins, Ian; Waters, David Martin; and Bays, David Edmund, 4,024,255.

Collins Machinery Corporation: *See—*
Houke, Howard F.; and Anderson, Freeman C., 4,023,983.

Combustion Engineering, Inc.: *See—*
Bevilacqua, Frank, 4,024,406.

Comerford, John M.; and Hammad, Mohamed W., to Personal Products Company. Non-planar arcuate shaped absorbent liner. 4,023,571, Cl. 128-290.00P.

Cominco Ltd.: *See—*
McKay, Donald Roderick; and Parker, Ernest George, 4,024,218.

Commonwealth Scientific and Industrial Research Organization: *See—*
Chandler, Bruce Veness; and Johnson, Robert Leonard, 4,024,334.

Communications Satellite Corporation (Comsat): *See—*
Virupaksha, Krishnamoorthy, 4,024,358.

Compac Corporation: *See—*
Crankshaw, Michael; Kucheck, Leo; and Caudill, Donald Lee, 4,024,011.

Compagnie Francaise de Raffinage: *See—*
Engelhard, Philippe; and Legendre, Michel, 4,024,077.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Sourgens, Jacques; Lajotte, Dominique; and Michelon, Francois, 4,024,357.

Compucorp: *See—*
Sperling, Irving, 4,024,505.

Computer Transceiver Systems, Inc.: *See—*
Epstein, Maurice J., 4,024,447.

Conax Corporation: *See—*
Miller, Francis M., 4,024,440.

Concrete Pipe Machinery Company: *See—*
Walchek, Ronald J., 4,023,771.

Confer Plastics, Inc.: *See—*
Confer, Raymond C., 4,023,647.

Confer, Raymond C., to Confer Plastics, Inc. Freestanding ladder structure. 4,023,647, Cl. 182-108.000.

Conti, Paolo; and Bianchi, Massimo, to Billi, S.p.A. Knit tubular article with transverse waist opening. 4,023,384, Cl. 66-172.00E.

Continental Gummi-Werke Aktiengesellschaft: *See—*
Kramer, Hans, 4,023,671.
Meiss, Barthold, 4,023,608.

Continental Oil Company: *See—*
Carlson, Jon R.; and Jackson, Robert G., 4,023,617.
Ziegenhain, William C., 4,024,231.

Conwed Corporation: *See—*
Akerson, David Wallace, 4,024,014.

Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, to Glaxo Laboratories Limited. 7β-[2-Etherified oximino-2-(thienyl-,furyl- or pyridylacetamido)]cephalosporins. 4,024,133, Cl. 260-243.00C.

Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, to Glaxo Laboratories Limited. 7β-[2-Etherified oximino-2-(phenyl- or naphthylacetamido)] cephalosporins. 4,024,137, Cl. 260-243.00C.

Cook, Martin Christopher: *See—*
Gregson, Michael; Cook, Martin Christopher; and Gregory, Gordon Ian, 4,024,134.

Coolant Equipment Corporation: *See—*
Troller, Robert J., 4,023,818.

Cooley, Kenton Parkes: *See—*
Jago, Edward John; and Cooley, Kenton Parkes, 4,024,007.

Coons, C. Curtis. Mail handling device. 4,023,843, Cl. 294-19.00R.

Cooper, Glenn Dale: *See—*
Bennett, James Gordy, Jr.; and Cooper, Glenn Dale, 4,024,107.

Cooper, Roy G.: *See—*
Ballard, Albert S.; Cooper, Roy G.; and Davis, Dwight E., 4,024,209.

Copal Company Limited: *See—*
Hayami, Tadao, 4,024,554.
Inoue, Nobuyoshi, 4,024,555.
Inoue, Nobuyoshi; and Shimizu, Munetaka, 4,024,556.
Matsumoto, Kunio, 4,024,549.

Coppage, John R.: *See—*
Kipple, Harry P.; Alke, Roger J.; Coppage, John R.; Price, Charles E.; and Sturman, Brian J., Jr., 4,023,943.

Cordes, Claus: *See—*
Zahn, Erwin; Cordes, Claus; Simon, Georg Nikolaus; and Weiss, Hans-Peter, 4,024,115.

Corn, John E., Jr., to General Electric Company. Process for the purification of 9,9-bis(4-hydroxyphenyl)-fluorene. 4,024,194, Cl. 260-619.00A.

Cornelius, Dennis Alfred; and Sternberg, Moshe M., to Miles Laboratories, Inc. Fortification of foodstuffs with C-terminal amino acid substituted methionine dipeptides. 4,024,286, Cl. 426-62.000.

Cornia, Richard P.: *See—*
Reed, Russell, Jr.; and Cornia, Richard P., 4,023,995.

Corning Glass Works: *See—*
Megles, John E., Jr.; and Richardson, Timothy W., 4,023,953.
Weetall, Howard H.; and Yaverbaum, Sidney, 4,024,235.

Corry, Thomas M., to General Motors Corporation. Inverter for supplying a regulated voltage. 4,024,453, Cl. 321-2.000.

Cosalt Limited: *See—*
Anderson, Alexander Adam; and Gallacher, Douglas Martin, 4,023,223.

Costales, Manuel; and Hakki, Moustafa I. Ring drive clutch lever. 4,023,340, Cl. 57-75.000.

Cowan, Samuel Joseph; and Little, John William, to Boeing Company, The. Fluid layer acoustic shield for turbofan jet propulsion engine. 4,023,644, Cl. 181-33.0HA.

Coy, David H.: *See—*
Schally, Andrew V.; and Coy, David H., 4,024,121.

Coyle, Forrest E.; Wilson, John R.; and Bharteey, Brij M., to Westinghouse Electric Corporation. Control center with insulated bus bars. 4,024,441, Cl. 361-334.000.

Crall, Frederick William: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,024,483.
Tomczak, Lawrence William; Crall, Frederick William; Caron, La Verne Andrew; and Campau, Walter Joseph, 4,024,484.
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,024,485.

Crankshaw, Michael; Kucheck, Leo; and Caudill, Donald Lee, to Compac Corporation. Label applicator with repetitive sequential firing order and method. 4,024,011, Cl. 156-299.000.

Crawford, William G. Metallic powder fluid suspension. 4,023,289, Cl. 40-106.210.

Cree, Gavin Murray: *See—*
Monks, Reginald; Riley, Anthony Leonard Mark; and Cree, Gavin Murray, 4,024,234.

Cremer, Helmut: *See—*
Knoche, Karl-Friedrich; Cremer, Helmut; and Steinborn, Gerhard, 4,024,230.

Cremosnik, Gregor, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Laser containing a laser resonator. 4,024,466, Cl. 331-94.50D.

Cressey, Philo Burton, Jr., to Scott Paper Company. Paper web coated with an all-latex adhesive coating composition. 4,024,313, Cl. 428-355.000.

Creusot-Loire Entreprises: *See—*
Bonnaure, Edouard, 4,023,963.

Crispe, Stanley William: *See—*
Mercer, Michael John; and Crispe, Stanley William, 4,023,475.

Croisier, Alain; and Desblache, Andre Eugene, to International Business Machines Corporation. System for detecting digital data transmitted by modulating a carrier. 4,024,342, Cl. 178-67.000.

Cryo-Power, Inc.: *See—*
Schneider, Richard N., 4,023,366.

CSELT - Centro Studi e Laboratori Telecomunicazioni SpA: *See*—
Bertoglio, Ottavio, 4,024,361.

Culp, David H.: *See*—
Lovell, Robert R.; Berkopec, Frank D.; and Culp, David H., 4,023,266.

Cumbo, Charles C.; and Bhatia, Kamlesh K., to Du Pont de Nemours, E. I., and Company. Production of butanediol. 4,024,197, Cl. 260-635.00E.

Curtis, Michel Georges August: *See*—
Marquaire, Roger Andre Marie; Curtis, Michel Georges August; and Schappel, Robert Edouard, 4,023,619.

Curtis, Richard M.: *See*—
Blytas, George C.; and Curtis, Richard M., 4,024,400.

Cutler-Hammer, Inc.: *See*—
Snowdon, Albert C.; and Dennison, William G., 4,023,885.

Dahl, Klaus J., to Raychem Corporation. Electrical conductor insulated by a polyketones. 4,024,314, Cl. 428-379.000.

Dahlberg, Reinhard. Alternating current energy converter. 4,024,410, Cl. 307-2.000.

Dahlmann, Horst: *See*—
Seidel, Horst; Dahlmann, Horst; Bothe, Rolf; and Schmidt, Hermann, 4,023,960.

Daly, John W.: *See*—
Darrow, Kenneth A.; and Daly, John W., 4,023,249.

Dammig, Werner, to Maschinenfabrik Loesch GmbH. Apparatus for breaking strips from plates, particularly from plates of chewing gum. 4,023,723, Cl. 225-97.000.

Dana Corporation: *See*—
Flotow, Richard A., 4,023,661.

Dantzler, Danny M., to Hy-Gain Electronics Corporation. Cabinet. 4,023,871, Cl. 312-107.000.

Dare Plastics Inc.: *See*—
Thurman, Paul G., 4,023,680.

Darrow, Kenneth A.; and Daly, John W., to General Electric Company. Method of manufacture of cooled turbine or compressor buckets. 4,023,249, Cl. 29-156.80H.

Darrow, Kenneth A., to General Electric Company. Method of manufacture of cooled turbine or compressor buckets. 4,023,251, Cl. 29-156.80H.

Davies, John W., III, to Gilson Bros. Co. Combined belt guard and guide. 4,023,429, Cl. 74-242.11R.

d'Avigneau, Jacques Marie: *See*—
Thomas, Philippe; Meyer, Jacques; and d'Avigneau, Jacques Marie, 4,024,111.

Davis, Dwight E.: *See*—
Ballard, Albert S.; Cooper, Roy G.; and Davis, Dwight E., 4,024,209.

Davis, Leslie Charles: *See*—
Ivett, Peter Robert; Tooth, Christopher; and Davis, Leslie Charles, 4,023,725.

Davis, Robert L.: *See*—
Lang, Thomas J.; Lang, Joseph A.; Lang, Kenneth G.; and Davis, Robert L., 4,023,864.

Davis, Wayne T., to Ethyl Corporation. Chemical process. 4,024,189, Cl. 260-585.00A.

Dean, Geoffrey J., to Ball Corporation. Method and apparatus for transferring cans. 4,023,513, Cl. 113-115.000.

Dearlove, William E.; and Engelking, Frederick S., to Caterpillar Tractor Co. Method of preparing fibrous concrete. 4,023,706, Cl. 222-1.000.

de Brito, William A. Plow attachment for snow blower. 4,023,287, Cl. 37-43.00R.

DeCesare, Dominic. Toy piano. 4,023,458, Cl. 84-236.000.

DeCota, Louis F. Golf swing training device. 4,023,811, Cl. 273-186.00R.

de Cremoux, Beaudouin, to Thomson-CSF. Electroluminescent diodes and a method of manufacturing same. 4,024,559, Cl. 357-17.000.

Deed, Lee H.: *See*—
MacDonald, Donald M.; and Deed, Lee H., 4,024,311.

Deere & Company: *See*—
Gregerson, Stanley Martin, 4,023,622.
Sorlie, Donald Thomas; Brandt, Henry William, Jr.; and Hitzhusen, Thomas E., 4,023,510.
Teal, Richard Donald, 4,023,635.

de Fillain, Paul de Cointet: *See*—
Pigerol, Charles; Chandavoine, Marie-Madeleine; de Fillain, Paul de Cointet; and Nanthavong, Souli, 4,024,155.

Dege, Gerald J.; and Liu, Kang-Jen, to Allied Chemical Corporation. Single film, high performance bipolar membrane. 4,024,043, Cl. 204-296.000.

Dehnke, Theodore H.: *See*—
Lauer, Richard P.; Rankl, Richard S.; and Dehnke, Theodore H., 4,024,329.

Dell'Amico, Daniela Belli; and Calderazzo, Fausto, to Snam Progetti S.p.A. Process for the preparation of anhydrous gold trichloride. 4,024,228, Cl. 423-491.000.

Demag Aktiengesellschaft: *See*—
Appel, Manfred, 4,023,667.
Kirstenpfad, Fritz; and Konning, Friedrich, 4,023,610.

Deman, Pierre; and Le Parquier, Guy, to Thomson-CSF. Channel switching unit for a telephone switching center and switching arrangements utilizing such units. 4,024,350, Cl. 179-15.0FS.

De Marco, Franco; and Rigo, Gualtiero, to Societa Italiana Telecomunicazioni Siemens S.p.A. Continuity-checking network for telecommunication system. 4,024,359, Cl. 179-175.30R.

DeMarthe, Jean-Michel; Sonntag, Alain; and Georgeaux, Andre, to Societe Miniere et Metallurgique de Penarroya. Method of obtaining copper from copper-bearing ores. 4,023,964, Cl. 75-101.00R.

de Maudave, Christian Fayd'Herbe. Method of producing high protein fertilizers and bird and stock feed from waste. 4,023,954, Cl. 71-15.000.

DeMayo, John F., to Sensonics, Inc. Powdered toner developing system in xerographic reproducing apparatus. 4,023,527, Cl. 118-655.000.

Denboer, Anthony J.: *See*—
Elmer, Ben R.; Tchon, Wallace E.; and Denboer, Anthony J., 4,024,514.

Dennis, James T., to Dennis, James T. Automatic record changer with cycle delay to facilitate changing of thin, lightweight records. 4,023,813, Cl. 274-10.00R.

Dennison, William G.: *See*—
Snowdon, Albert C.; and Dennison, William G., 4,023,885.

Denov, Sam; Bull, Rame W.; and Bartky, Walter Scott, to Denov, Sam. Musical instrument tuning device. 4,023,462, Cl. 84-454.000.

Derckx, Henricus Antonius Jacobus Maria. Sorting and directing plant for lollipops. 4,024,058, Cl. 209-73.000.

DeRees, Delbert Duane, to American Motors Corporation. Vehicle sun shield. 4,023,856, Cl. 296-97.00R.

Derenbecher, William Joseph, Jr., to RCA Corporation. PAL alternate line color phase detector. 4,024,572, Cl. 358-18.000.

DeRyke, Thomas V.: *See*—
Patzke, Robert C.; DeRyke, Thomas V.; Ernohazy, Stephen; and Oddo, Eugene P., 4,023,592.

De Santo, Joseph J. In-line continuous checkweigher. 4,023,668, Cl. 198-504.000.

Desblache, Andre Eugene: *See*—
Croisier, Alain; and Desblache, Andre Eugene, 4,024,342.

Deutsche Texaco Aktiengesellschaft: *See*—
Cherubim, Martin, 4,024,109.

de Vries, Thijs Jisse, to U.S. Philips Corporation. HF signal transmission device. 4,024,479, Cl. 333-8.000.

Dewan, Shashi B.; and Olsen, Robert M., to Vapor Corporation. Drive circuit for induction motor used in air conditioning system of a railway vehicle. 4,024,444, Cl. 318-227.000.

Diamond Shamrock Corporation: *See*—
Brannan, James R.; and Malkin, Irving, 4,024,044.

Dias, Francesco: *See*—
Luhleich, Hartmut; Nickel, Hubertus; Pflaum, Peter; and Dias, Francesco, 4,023,979.

Dibble, Gordon L.; and Russell, Stewart T., to Rockwell International Corporation. Method of flow forming. 4,023,389, Cl. 72-38.000.

Dickinson, Harvey Frank, to Ferranti, Limited. Follow-up servo systems for clutches. 4,023,660, Cl. 192-.075.

Didier Engineering GmbH: *See*—
Fruhbuss, Heinrich, 4,024,022.

Didow, Donald G.: *See*—
Presler, Donald P.; and Didow, Donald G., 4,023,372.

Die Firma Carl Cloos: *See*—
Cloos, Erwin, 4,024,374.

Diebold, James P.: *See*—
Vetter, Ronald F.; Diebold, James P.; Sieg, George F.; Gerrish, Howard W., Jr.; Payne, Howard H.; Rhyn, Elmer J.; and Witcosky, Irvin F., 4,023,354.

Diefenbach, Horst; and Platt, Karl-Ludwig, to BASF Aktiengesellschaft. Baking finishes which do not pollute the environment. 4,024,327, Cl. 526-50.000.

Diethelm, Otto, to Blaupunkt-Werke GmbH. Controlled power supply for a television receiver equipped with remote control. 4,024,577, Cl. 358-190.000.

Difley, Charles Rogers; and McDonald, William Roy, to Whirlpool Corporation. Easy open compactor drawer. 4,023,875, Cl. 312-319.000.

Di Franco, Roy P. Meat trimmer and scraper assembly. 4,023,271, Cl. 30-123.000.

Diggs, Richard E. High-speed ground transportation system. 4,023,500, Cl. 104-138.00R.

Dijstelbergen, Harmen H.: *See*—
Burrie, Peter H.; Dijstelbergen, Harmen H.; and Koreman, Cornelis W., 4,024,449.

di Marco, Aurelio: *See*—
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and di Marco, Aurelio, 4,024,224.

Di Matteo, Paul L., to Dynell Electronics Corporation. Invalid bed arrangement. 4,023,218, Cl. 5-81.00R.

Dimitracopoulos, Panayotis Constantine: *See*—
Kennington, Frank William; and Dimitracopoulos, Panayotis Constantine, 4,023,440.

Director-General of the Agency of Industrial Science and Technology: *See*—
Takahashi, Tadao, 4,024,201.

Dischert, Robert Adams; and Walter, James Morgan, to RCA Corporation. Synchronizing system employing burst crossover detection. 4,024,571, Cl. 358-4.000.

Dixon, Robert C. Camping toaster. 4,023,474, Cl. 99-393.000.

Dobler, Karl U., to International Standard Electric Corporation. Vehicle control system. 4,023,753, Cl. 246-5.000.

Dobo, Emerick J., to Monsanto Company. Method for producing corded steel wire. 4,023,989, Cl. 148-16.000.

Dobritz, Gunther, to Dragerwerk Aktiengesellschaft. Method and apparatus for mixing two gases in a predetermined proportion. 4,023,587, Cl. 137-88.000.

Dockery, Denzel J. Breathing apparatus for underwater use. 4,023,701, Cl. 220-64.000.

Dr. -Ing. H.c.F. Porsche Aktiengesellschaft: *See—*
Soffge, Friedhelm; and Schubecker, Archim, 4,023,226.

Dodge, Peter W. Articulated handlebars for bicycles and the like. 4,023,436, Cl. 74-551.300.

Doguchi, Nobushige; and Fujisaki, Yoshinori, to Yoshida Kogyo Kabushiki Kaisha. Emergency opening slider for slide fasteners. 4,023,244, Cl. 24-205.15E.

Dolata, Hans; and Sauermilch, Rolf, to Andreas Stihl Maschinenfabrik. Saw chain for motor chain saws. 4,023,453, Cl. 83-174.000.

Dolby Laboratories, Inc.: *See—*
Dolby, Ray Milton; and Plunkett, Philip Charles, 4,024,344.

Dolby, Ray Milton; and Plunkett, Philip Charles, to Dolby Laboratories, Inc. Center channel derivation for stereophonic cinema sound. 4,024,344, Cl. 179-1.00G.

Dominion Lock Company Ltd.: *See—*
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Dore, James E.; Yarwood, John C.; and Preuss, Robert K., to Swiss Aluminium Ltd. Ceramic foam and method of preparation. 4,024,212, Cl. 264-44.000.

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Dowling, Terence S.; Dompe, Robert J.; Heard, Harry G.; and Hazard, Keith K., to MB Associates. Laser-excited marking system. 4,024,545, Cl. 346-76.00L.

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Drew, Bernard, Jr.; and Auyang, John H. C., to Gainesville Machine Company, Inc. Apparatus and method for detecting and dispensing articles of preselected weights suspended from shackles. 4,024,053, Cl. 209-73.000.

Drouin, Clause, to Les Industries Bfg Limitee. Evaporation tray for refrigerators. 4,023,380, Cl. 62-279.000.

Druckrey, Eike; Knabe, Bernd; Lang, Hans-Jochen; Babej, Milos; and Muschaweck, Roman, to Hoechst Aktiengesellschaft. Benzylamine derivatives and process for preparing them. 4,024,274, Cl. 424-282.000.

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Dunham, Russell H., to Dunham Tool Company, Inc., The. Collet chuck assembly for custom applications. 4,023,815, Cl. 279-46.00R.

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Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, to Smith Kline & French Laboratories Limited. Ethylene derivatives. 4,024,260, Cl. 424-263.000.

Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Pharmacologically active guanidine compounds. 4,024,271, Cl. 424-274.000.

Duryea, George R., Jr., to Calspan Corporation. Belt stabilizing apparatus. 4,023,426, Cl. 74-241.000.

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Duval, David; and Taylor, Edward Henry, to Foster Wheeler Corporation. Steam generating plant. 4,024,019, Cl. 176-65.000.

DuVall, Wilbur E., to Xerox Corporation. Keyboard encoding with repeat key pause. 4,024,534, Cl. 340-365.00S.

Dyckerhoff & Widmann Aktiengesellschaft: *See—*
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Eaton Yale Ltd.: *See—*
Jasinski, Stanley K.; and Odorico, Frank A., 4,023,603.

Eberwein, Helmut; Vogt, Alfred; and Greb, Paul, to Preh Elektrofeinmechanische Werke, Jakob Preh Nachf. Device for remote control of electrical power units. 4,024,502, Cl. 340-147.00R.

Econo Fuel Systems, Inc.: *See—*
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Eder, Ulrich: *See—*
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Edge, Gordon Malcom; Ridler, Keith Douglas; and Easthope, Frederick James, to Strathearn Audio Limited. Stroboscopic device. 4,024,473, Cl. 324-168.000.

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Eggelsmann, Harry; and Hodum, Claus Peter, to U.S. Philips Corporation. Rotary-anode X-ray tube. 4,024,424, Cl. 313-60.000.

Egid, Eugene I. Method of mixing and apparatus therefor. 4,023,780, Cl. 259-102.000.

Eichel, Bertram; and Lisanti, Vincent F. Novel compositions for estab-

lishing environmental conditions favorable to oral leucocytes. 4,024,237, Cl. 424-49.000.

Eifer, Gerd, to S.A. des Anciens Etablissements Paul Wurth. Tuyere stock and compensator joint therefore. 4,023,782, Cl. 266-186.000.

Eiland, John H. Heat shielding foot rest for attachment to a motorcycle exhaust system. 4,023,821, Cl. 280-291.000.

Eisenwerk-Gesellschaft Maximilianshutte mbH: *See*—
Brotzmann, Karl; Fassbinder, Hans Georg; Mantey, Paul Gerhard; Grapengiesser, Johann Claus; and Hansen, Alfred, 4,023,713.
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Elliott, Michael; Janes, Norman Frank; and Pulman, David Allen, to National Research Development Corporation. Insecticides. 4,024,163, Cl. 260-347.400.

Ellis, Gwynn Pennant; Collins, Ian; Waters, David Martin; and Bays, David Edmund, to Allen & Hanburys Limited. Tetrazole containing naphthyridine-3-carboxamides. 4,024,255, Cl. 424-248.540.

Ellman, Julius; and Lerner, George. Inflatable toy. 4,023,816, Cl. 280-1.130.

Elmer, Ben R., to Honeywell Information Systems, Inc. CCD register array addressing system including apparatus for by-passing selected arrays. 4,024,509, Cl. 340-172.500.

Elmer, Ben R.; Tchon, Wallace E.; and Denboer, Anthony J., to Honeywell Information Systems, Inc. Multiphase series-parallel-series charge-coupled device registers with simplified input clocking. 4,024,514, Cl. 340-173.0CA.

Elsing, John William. Portable ski tow apparatus. 4,023,502, Cl. 104-173.0ST.

Emmett, John Colin: *See*—
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Emmons, William D., to Rohm and Haas Company. Hydrocurable compositions of hydroxy(polyalkylenecarbonyloxy)-alkyleneoxazolidine and an isocyanate. 4,024,117, Cl. 260-78.30R.

Enchev, Ivan Dimitrov; Ilel, Eliesser Persiado; Kunchev, Nikola Tzanov; Harizanov, Kiril Georgiev; Genevski, Vladimir Vetov; Draganov, Nedelcho Draganov; Haralampiev, Georgi Alexandrov; Smilenov, Todor Ivanov; Stoyanov, Yossif Genchev; and Alexandrov, Alexander Minchev, to Nipki po Tzvetna Metalurgia. Method for electric extraction of non-ferrous metals from their solutions. 4,024,035, Cl. 204-105.00R.

Enfors, Sven Olof; Molin, Nils Ludvig; Mosbach, Klaus Hermann; and Nilsson, Hans Jorgen, to Servo Chem AB. Enzyme electrode. 4,024,042, Cl. 204-195.00P.

Engel, John Francis, to FMC Corporation. Phosphoro-aminosulfenyl derivatives of benzofuran carbamates. 4,024,277, Cl. 424-285.000.

Engel, Neils N.: *See*—
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Engelhard, Philippe; and Legendre, Michel, to Compagnie Francaise de Raffinage. Catalysts for the isomerization of hydrocarbons, and process for the preparation of said catalysts. 4,024,077, Cl. 252-442.000.

Engelking, Frederick S.: *See*—
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Enomoto, Hiroshi: *See*—
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, 4,024,280.

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Ernohazy, Stephen: *See*—
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Ernst, Alfred. Hand-operable durometer. 4,023,401, Cl. 73-81.000.

Erthein, Marc. Garment clamping hanger with spring-biased clamping members. 4,023,721, Cl. 223-96.000.

Escher, Hans. Temperature measuring device. 4,023,411, Cl. 73-349.000.

Escher Wyss Limited: *See*—
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Esco Manufacturing Company: *See*—
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Essad, Robert A.: *See*—
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ETA A.G. Ebauches-Fabrik: *See*—
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Everitt, Delmar K.: *See*—
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,023,524.

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Evers, William J.: *See*—
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Ewing, Lloyd; and Bykowski, Michael J., 4,023,835.

Ewing, Lloyd; and Bykowski, Michael J., to Ewing Engineering Company. Push-type coupling and conduit pipe assembly. 4,023,834, Cl. 285-235.000.

Ewing, Lloyd; and Bykowski, Michael J., to Ewing Engineering Company. Conformable thin-wall shear-resistant coupling and pipe assembly. 4,023,835, Cl. 285-235.000.

Exxon Research and Engineering Company: *See*—
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Fadler nee Jack, Birgid; and Maier, Hans-Peter, to Hoechst Aktiengesellschaft. Process for obtaining multicolor effects. 4,023,925, Cl. 8-21.00C.

Fagle, Joseph Z.: *See*—
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Fahrner, Willard F. Dredge pipe coupling system. 4,023,518, Cl. 114-244.000.

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Ferranti, Limited: *See*—
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Ferry, Everett B. Ambient air assist for a refrigerator unit. 4,023,947, Cl. 62-180.000.

Fiber Industries, Inc.: *See*—
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Fiedler, Dolores E. Package and identification record for an intrauterine device. 4,023,678, Cl. 206-363.000.
Filko, Colin; Smith, Richard Stanley; and McIntosh, Lawrie Gandier, to Sterling Glove Co., Ltd. Glove turning and blocking process and apparatus. 4,023,720, Cl. 223-40.000.
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Fink, Robert H., to United States of America, Army. Ejector motor braking system. 4,023,496, Cl. 102-49.400.
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Finsterwalder, Ulrich; and Finsterwalder, Klemens, to Dyckerhoff & Widmann Aktiengesellschaft. Liquid storage float formed of steel concrete or prestressed concrete. 4,023,514, Cl. 114-256.000.
Fintelmann, Carl H.; and Zaske, Oscar C., to Vistron Corporation. Stabilized brominated polyesters. 4,024,206, Cl. 260-865.000.
Fischer, Siegmar; Silligmann, Karl-Heinz; and Prochnow, Juergen, to Rheinmetall G.m.b.H. Twist brakes for projectiles. 4,023,495, Cl. 102-35.600.
Fisher, John F.: *See*—
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Maserang, Robert E.; and Fitzjarrald, Norman L., 4,023,299.
Fizer, Charlie W. Combined measuring tape and compass. 4,023,277, Cl. 33-27.00C.
Fleck, Carl M. Method and apparatus for measuring burn-up of nuclear fuel in a reactor. 4,024,017, Cl. 176-19.00R.
Fleck, Rene, to Societe Anonyme dite: TIM-FLECK S.A. Shelving units. 4,023,505, Cl. 108-110.000.
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Fluck, Rene, to SIG Schweizerische Industrie-Gesellschaft. Article counting and grouping apparatus. 4,024,381, Cl. 235-92.0PK.
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Fontana, Joseph R. Mold box and mold head. 4,023,767, Cl. 249-52.000.
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Stickels, Charles A.; Anderson, Anthony T.; and Janotik, Adam M., 4,023,988.
Formex Manufacturing, Inc.: *See*—
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Fornasari, Paolo, to Libero Elettrotecnica. Safety device for water supply line of a washing machine. 4,023,708, Cl. 222-20.000.
Forschirm, Alex S., to Celanese Corporation. Textile cleaning process. 4,023,927, Cl. 8-137.000.
Forster, Eric O.; and Vanderbilt, Byron M., to Exxon Research and Engineering Company. Metal-filled plastic material. 4,024,318, Cl. 428-519.000.
Fortin, Jean Marie. Construction element. 4,023,323, Cl. 52-712.000.
Fortini, Jack G.; Blair, Walter A.; and Grodsky, Gerold M., to Palolab Pharmaceuticals Corporation. Composition and method of using a protein mixture derived from liver. 4,024,247, Cl. 424-177.000.
Foseco Trading A.G.: *See*—
Jago, Edward John; and Cooley, Kenton Parkes, 4,024,007.
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Franklin, William E.; and Rowland, Stanley P., to United States of America, Agriculture. High-molecular weight acidic polymers. 4,024,099, Cl. 260-29.60H.
Franksen, Holger: *See*—
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Frazee, Ray D.; and Ford, Charles Russell, to Carlisle Corporation. Wheel and axle assembly. 4,023,640, Cl. 180-76.000.
Freeman, Andrew S.; and Haan, John R., to Even Flo Silage Distributor, Inc. Silo filling apparatus. 4,023,688, Cl. 214-17.00C.
Freeman, Charles F.: *See*—
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Frei, Alfred; Schoefberger, Georg; and Schweizer, August, to Sandoz Ltd. Concentrated aqueous dye compositions containing a low molecular weight amide and their use for dyeing paper. 4,023,924, Cl. 8-7.000.
Freimuth, John H.: *See*—
McAllister, Ronald L.; and Freimuth, John H., 4,023,479.
French, John Barry; Reid, Neil M.; and Buckley, Janette A. Apparatus for analyzing trace components. 4,023,398, Cl. 73-23.000.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
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Friedman, Jack S.; and Kenney, William J., to Friedman, Jack S. Retractable bristle brush. 4,023,230, Cl. 15-185.000.
Frierdich, Richard D.: *See*—
Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., 4,023,524.
Fringeli, Werner, to Ciba-Geigy Corporation. 4,4'-Bis-(s-triazin-6-yl-amino)-stilbene-2,2'-disulphonic acid. 4,024,071, Cl. 252-301.230.
Frisbee, Claude M., to J. I. Case Company. Blade angle adjustment mechanism for bulldozer or the like. 4,023,624, Cl. 172-805.000.
Frisoli, David M. Hammer actuators for firearms. 4,023,296, Cl. 42-69.00B.
Fritz Buser AG Maschinenfabrik: *See*—
Thierstein, Hans, 4,024,045.
Fritz, Ernst; and Fassbinder, Hans Georg, to Eisenwerk-Gesellschaft Maximilianshutte mbH. Tuyere for metallurgical vessels. 4,023,781, Cl. 266-44.000.
Fruhbuss, Heinrich, to Bergwerksverband GmbH; and Didier Engineering GmbH. Method of inhibiting dust formation when feeding coal into coking chambers. 4,024,022, Cl. 201-23.000.
Fry, Raymond C.: *See*—
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Fuji Oil Company Ltd.: *See*—
Shibata, Osamu; and Taniguchi, Hitoshi, 4,024,000.
Fuji Photo Film Co., Ltd.: *See*—
Aoyama, Keiichi; Kaneko, Keeji; Muramatsu, Katsuji; and Futagawa, Ikuo, 4,024,557.
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Fujita, Tatsu; Yamada, Yoshiro; Mizuta, Atsuo; Yamada, Tetsuo; Tsuda, Osamu; Kaneda, Tsugio; Shimazu, Shinichi; and Wada, Yukio, to Kobe Steel Ltd. Method and apparatus for cooling hot rolled rod. 4,023,392, Cl. 72-201.000.
Fujita, Yukio: *See*—
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, 4,024,280.
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Fukuzawa, Akira: *See*—
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Funakubo, Shinnosuke. Grinder plate for meat choppers and method of manufacturing the same. 4,023,253, Cl. 428-566.000.
Furukawa, Toshiyuki; and Kato, Toshio, to Yamanouchi Pharmaceuti-

cal Co., Ltd. Diagnostic scale for interpretation of electrocardiogram. 4,023,276, Cl. 33-1.00C.
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Gamadia, Rustom Kooverji: *See—*
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Gamberg, William. Coin slot for flip top can. 4,023,728, Cl. 232-4.00R.
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Ganoung, David P. Powertrain and method for achieving low exhaust emission and high fuel economy operation of a combustion engine. 4,023,641, Cl. 180-66.00R.
Gante, Joachim: *See—*
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Garcia, G. E.: *See—*
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Garcia, George E., to Garcia, G. E.; Jackson, P. C.; Spragg, T. G.; Childs, S. A.; Randle, Edwin W.; Randle, Thelma H.; and Shields, James G., part interest to each. Pressure monitoring device. 4,023,415, Cl. 73-410.000.
Gard, Inc.: *See—*
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Gardiner, Kenneth W.: *See—*
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Gelfand, Nina Abramovna, administrator: *See—*
Lainer, Jury Abramovich; Tagiev, Eldar Ismail Ogly; Nasyrov, Gakif Zakirovich; Zakharova, Valentina Ivanovna; Lainer, Abram Ilich, deceased; Lainer, Vera Nikolaevna, administrator; Lainer, Jury Abramovich, administrator; and Gelfand, Nina Abramovna, administrator, 4,024,087.
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Gilbert, Lawrence A.; and Schuette, John W., to Procter & Gamble Company, The. Liquid detergent composition. 4,024,078, Cl. 252-551.000.

Gill, George Herbert. Homopolar motor-battery. 4,024,422, Cl. 310-178.000.

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Glaser, David, to Panel Technology, Inc. Operating voltage supply system for gas discharge display panel. 4,024,429, Cl. 315-169.0TV.

Glaser, Hellmut I. Method and apparatus for melting and processing glass. 4,023,950, Cl. 65-29.000.

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Goel, Narendra S., to Xerox Corporation. Transfer apparatus. 4,023,894, Cl. 355-3.00R.

Golchert, Robert L. Food decorating process. 4,024,287, Cl. 426-383.000.

Gold, Louis. Hydraulic mining and transportation of coal using hot oil under pressure. 4,023,862, Cl. 299-14.000.

Goldfarb, Adolph E.; Benkoe, Erwin; Everitt, Delmar K.; Chesley, Ronald F.; and Frierdich, Richard D., to Goldfarb, Adolph E.; and Benkoe, Erwin. Toy spray painting system. 4,023,524, Cl. 118-301.000.

Goldstein, Amnon: *See—*
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Goode, Robert D. Object loading and unloading apparatus. 4,023,690, Cl. 214-146.500.

Goodwin, Roy. Face fly device. 4,023,532, Cl. 119-156.000.

Goodyear Aerospace Corporation: *See—*
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Gordon, John Herbert; and Duchnowski, Frank A., to J. H. Horne & Sons, Inc. Cylinder mold former with flow box and pressure lid. 4,024,016, Cl. 162-214.000.

Gordon, Maxwell: *See—*
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Goto, Kenjiro, to Mansei Kogyo Kabushiki Kaisha. Smoker's lighter. 4,023,922, Cl. 431-264.000.

Gottschlich, Rudolf: *See—*
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Gregerson, Stanley Martin, to Deere & Company. Tractor with draft load control. 4,023,622, Cl. 172-9.000.

Gregornik, Norman W.; and Pickering, Dennis R., to Honeywell Inc. Plastic to metal bonding method. 4,024,008, Cl. 156-272.000.

Gregory, C. Albert; and Gregory, R. Lane. Automatic tobacco harvester and defoliator assembly therefor. 4,023,331, Cl. 56-27.500.

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Greten, Berndt, to Bison-werke Bahre & Greten GmbH & Co. KG. Process and apparatus for the production of chipboards, or like panels from a mixed material. 4,023,776, Cl. 259-2.000.

Grey, Vincent G. Flatbed car container sewing device. 4,023,504, Cl. 105-366.00B.

Griffith, Donald P.; and Musher, Daniel M. Method and composition for treating urinary tract infections. 4,024,256, Cl. 424-249.000.

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Groll, Manfred; Hederich, Volker; and Bien, Hans-Samuel, to Bayer Aktiengesellschaft. Polycyclic dyestuffs. 4,024,144, Cl. 260-251.00A.

Grop, Olof Sune, to Tekniska Rontgencentralen AB. Conveying installation. 4,023,503, Cl. 105-30.000.

Gross, Thomas A. O. Ground fault protective systems with variable rate integration of fault signals. 4,024,435, Cl. 361-45.000.

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Gruber, Gerald W., to PPG Industries, Inc. Photocatalyst system and pigmented actinic light polymerizable coating compositions containing the same. 4,024,296, Cl. 427-53.000.

Gruber, Gerald W., to PPG Industries, Inc. Actinic light polymerizable coating compositions. 4,024,297, Cl. 427-54.000.

Grudkowski, Thomas Walter: *See—*
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Grumblatt, James E., to Rahme, Selim R. System for simulating parameters of a testing device. 4,023,395, Cl. 73-2.000.

Grunder, Hans; and Setz, Walter, to Ciba-Geigy Corporation. Apparatus for producing a laminar flow. 4,023,472, Cl. 98-40.00D.

Gruppo Lepetit S.p.A.: *See—*
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Gurry, George W., to McCarthy, Bertram Frederick. Electrical circuit means for detecting the frequency of input signals. 4,024,414, Cl. 307-233.00R.

Gurtner, Bernard Jean Robert: *See—*
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Gustafson, Inc.: *See—*
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Gustafsson, Sven-Arne: *See—*
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Guth, Hans; Jonas, Gerhard; Kleine-Weischede, Klaus; Wieschen, Hermann; Kaiser, Hans-Joachim; Dorr, Karl-Heinz; and Grimm, Hugo, to Bayer Aktiengesellschaft; and Metallgesellschaft Aktiengesellschaft. Process for dehydrating gas with sulfuric acid. 4,023,938, Cl. 55-30.000.

Gutierrez Atencio, Francisco Jose. Ice bearing. 4,023,866, Cl. 308-77.000.

H. Bodtcher-Hansen A/S: *See—*
Olesen, Kaj Sigard; and Bodtcher-Hansen, Henrik, 4,024,375.

H. Koch & Sons, Inc.: *See—*
Poehlmann, Paul W., 4,023,846.

Haan, John R.: *See—*
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Haas, Fritz: *See—*
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Haber, Terry M. Oil dip stick wiper. 4,023,231, Cl. 15-210.00B.

Haber, Terry M. Wristwatch casing and band construction. 4,023,347, Cl. 58-88.00R.

Habermann, Helmut: *See—*
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Habermeier, Juergen; and Porret, Daniel, to Ciba-Geigy Corporation. Diacrylic acid ester derivatives of uracil compounds. 4,024,146, Cl. 260-260.000.

Habersack, Walter: *See—*
Doring, Christfried; Thomas, Johann; Volcker, Manfred; Sparwald, Volker; and Habersack, Walter, 4,024,034.

Haehn, James B.: *See—*
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Haensel, Vladimir, to UOP Inc. Catalytic fume control device. 4,023,928, Cl. 21-74.00R.

Haertl, Hans-Dietmar: *See—*
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Haffer, Gregor: *See—*
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Hagenson, Leo J., to Foldcraft Company. Seat anchor. 4,023,859, Cl. 297-158.000.

Haggerty, Patrick E. Tennis racket case. 4,023,800, Cl. 273-74.000.

Hagiwara, Mituharu: *See—*
Higashi, Tadatoshi; Yoshimoto, Mitsunori; Hagiwara, Mituharu; and Ishigami, Toshihiko, 4,024,425.

Hahn, Hans-Jurgen, to Messerschmitt-Bolkow-Blohm GmbH. Method of applying a firmly adherent metallic coating to titanium and titanium alloy. 4,024,303, Cl. 427-295.000.

Haigh, Harold Edward: *See—*
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Hairsine, Peter Wilfred: *See—*
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Hakki, Moustafa I.: *See—*
Costales, Manuel; and Hakki, Moustafa I., 4,023,340.

Haldimann, Hans Rudolf. Speed control device. 4,023,501, Cl. 104-147.00R.

Haley, Ernest K. Transfer table. 4,023,672, Cl. 198-735.000.

Hall, Kimball P. Multi-flow marine jet-propulsion apparatus. 4,023,353, Cl. 60-221.000.

Halsey, Carl C.: *See—*
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Halter, Paul, Jr.: *See—*
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Hammad, Mohamed W.: *See—*
Comerford, John M.; and Hammad, Mohamed W., 4,023,571.

Hammes, Theo, to Mauser Kommanditgesellschaft. Plastic barrel. 4,023,679, Cl. 206-504.000.

Hanazono, Masanobu; Asai, Osamu; and Tamura, Katsumi, to Hitachi, Ltd. Method of forming deposition films for use in multi-layer metallization. 4,024,041, Cl. 204-192.00C.

Hancock, James E.; and Stuller, Howard E., to Clark Equipment Company. Four-wheeled elevating scraper. 4,023,285, Cl. 37-8.000.

Handl, Werner, to Staedtler, J. S. Unburnt lead refill for writing and drawing pencils. 4,023,974, Cl. 106-26.000.

Hankel, Rainer, to Robert Bosch G.m.b.H. Integrated circuit CMOS inverter structure. 4,024,418, Cl. 307-304.000.

Hanlon, Gary D.: *See—*
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Hanna, Daniel C. Wheel cleaner. 4,023,228, Cl. 15-53.00B.

Hansel, William B., to Sun Oil Company of Pennsylvania. Interlock system for a gasoline dispensing nozzle with a vapor receiving system. 4,023,601, Cl. 141-207.000.

Hansen, Alfred: *See—*
Brotzmann, Karl; Fassbinder, Hans Georg; Mantey, Paul Gerhard; Grapengiesser, Johann Claus; and Hansen, Alfred, 4,023,713.

Hansen, Glen D., to Veda, Inc. Conveyor drop structure. 4,023,673, Cl. 198-735.000.

Hanslik, Tomas: *See—*
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Hanson, Gary L. Universal flip-up attachment for helmets. 4,023,210, Cl. 2-10.000.

Hanson, Morris R. Apparatus for planting a plurality of individual seeds in a planting furrow. 4,023,509, Cl. 111-77.000.

Haralampiev, Georgi Alexandrov: *See—*
Enchev, Ivan Dimitrov; Ilel, Eliesser Persiado; Kunchev, Nikola Tzanov; Harizanov, Kiril Georgiev; Genevski, Vladimir Vetov; Draganov, Nedelcho Draganov; Haralampiev, Georgi Alexandrov; Smilenov, Todor Ivanov; Stoyanov, Yossif Genchev; and Alexandrov, Alexander Minchev, 4,024,035.

Harder, Arthur J., Jr., to Coach & Car Equipment Corporation. Seat back with limited access to the rear thereof. 4,023,860, Cl. 297-283.000.

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Harle, Fritz: *See—*
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Harms, Horst, to Aktiengesellschaft "Weser". Coupling for marine vessels. 4,023,519, Cl. 114-247.000.

Harney, Ralph P.; and Guif, Stanley E., to Oak Industries Inc. Catv sine wave coding system. 4,024,575, Cl. 358-118.000.

Harpman, Webster B.; and Mahoney, Fred G., to Econo Fuel Systems, Inc. Hot fuel gas generator. 4,023,538, Cl. 123-3.000.

Harris, James R.; and Kalkhoven, Allen B., to Oregon Drop Corporation, The. Manhole construction. 4,023,590, Cl. 137-363.000.

Harris, Paul, to United States of America, Army. Optical switch. 4,023,498, Cl. 102-70.20R.

Harris, Robert D., to General Electric Company. Mechanism for coin-operated timer run time accumulator. 4,023,419, Cl. 74-30.000.

Harrison, Stuart A. Phenyl isocyanate derivatives of radiation curable oligomers. 4,024,177, Cl. 260-472.000.

Harschel, Jonas C. Device to remove excess water from plant containers. 4,023,305, Cl. 47-81.000.

Hart Chemical Limited: *See—*
Shane, Hugh J. S.; Schell, Frederick S.; and Kasem, Mohammad A., 4,024,072.

Hart, Gerald E. Doppler-radar, projected terrain-clearance system. 4,024,537, Cl. 343-5.00R.

Hartenstein, Johannes: *See—*
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Hartmann, Gunter; Schwarz, Joachim-Ullrich; and Keil, Klaus, to Siemens Aktiengesellschaft. Simplified housing structure including a heat sink for a semiconductor unit. 4,024,570, Cl. 357-81.000.

Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., to System Development Corporation. Method and apparatus for scrambling and unscrambling communication signals. 4,024,576, Cl. 358-124.000.

Hartung, Walter: *See—*
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Hartwig, Gerhard, to Siemens Aktiengesellschaft. Toggle lever switching mechanism for an automatic switching apparatus including a low-voltage tripping device. 4,024,366, Cl. 200-153.00G.

Haruyama, Osamu: *See—*
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Harvey, Edwin B. Portable bag spreader. 4,023,842, Cl. 294-1.00R.

Hashimoto, Akihiko: *See—*
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Hashimoto, Kenichiro: *See—*
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Haskell, Donald M., to Phillips Petroleum Company. Extractive distillation of hydrocarbon mixtures. 4,024,028, Cl. 203-51.000.

Hata, Hiroyoshi: *See—*
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Hatch, Kenneth F., to Picker Corporation. Data derandomizer and method of operation for radiation imaging detection systems. 4,024,398, Cl. 250-363.00S.

Hatzakis, Michael, to International Business Machines Corporation. High sensitivity resist system for lift-off metallization. 4,024,293, Cl. 427-43.000.

Haug, Edward W.; and Beck, Charles E., to Barber-Colman Company. Inserted blade hob. 4,023,246, Cl. 29-103.00B.

Haugen, Leonard R.: *See—*
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Hawes, William S.: *See—*
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Hawkins, Lloyd J. Trailer frame with load bunks. 4,023,694, Cl. 214-396.000.
Hawrylo, Frank Zygmunt; and Kressel, Henry, to RCA Corporation. Semiconductor ohmic contact. 4,024,569, Cl. 357-71.000.
Hayami, Tadao, to Copal Company Limited. Focal plane for photographic cameras. 4,024,554, Cl. 354-242.000.
Hayashi, Masaki; Kori, Seiji; Wakatsuka, Hirohisa; and Konishi, Yoshitaka, to Ono Pharmaceutical Company. Tranes-delta 2-prostaglandins. 4,024,174, Cl. 260-468.00D.
Hayashi, Toshio; and Haruyama, Osamu, to Ricoh Co., Ltd. Excess developing liquid removing device for electrophotography. 4,023,899, Cl. 355-10.000.
Hayward, Edward C.: *See—*
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Shell, Don C.; and Hayward, Edward C., 4,024,049.
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Heath, Harry Charles. Mowing machine. 4,023,334, Cl. 56-297.000.
Hebert, Dalton P. Resilient force resistor type exercising device. 4,023,808, Cl. 272-137.000.
Hebert, Roger T.; Pappas, John A.; and Shea, Richard J., to GTE Sylvania Incorporated. Lamp and lens retrofit assembly for overhead projector. 4,023,893, Cl. 353-100.000.
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Hellmig, Ehrhard; and Ranz, Erwin, to AGFA-Gevaert, A.G. Light-sensitive color photographic material with masking layer comprising spontaneously silver halide. 4,023,970, Cl. 96-6.000.
Hellstrom, Nils Erik; and Berg, Bengt Artur, to A B Hammars Mekanisha Verkstad. Method for grading and measuring lumber and a trimming device for performing said method. 4,023,605, Cl. 144-312.000.
Hempstead, Robert Douglas: *See—*
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Hennessey, William M.; Caras, Bernard; Steckowich, John, Jr.; and Bratro, Frederick E., to Burroughs Corporation. Means for coupling a connector cable to contacts on a substrate. 4,023,877, Cl. 339-17.00F.
Hennessey, William M., to Burroughs Corporation. Electrical coupling means. 4,023,878, Cl. 339-17.00F.
Henniger, Peter Wolfgang; and Van Harrewijn, Antoon, to Gist-Brocades N.V. Process for the preparation of heterocyclic compounds. 4,024,129, Cl. 260-239.100.
Henrick, Clive A., to Zoecon Corporation. Mite control using alkyl esters of alkynyl acids. 4,024,278, Cl. 424-314.000.
Herb, Eugen; and Petera, Theodor, to Trumph Maschinene AG, Firma. Device for automatically shifting a workpiece on a nibbling machine. 4,023,788, Cl. 269-73.000.
Herbst, Noel Martin; and Morrissey, John Henry, to International Business Machines Corporation. Segmentation mechanism for cursive script character recognition systems. 4,024,500, Cl. 340-146.3SG.
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Hewitt, John T. Exhaust temperature monitoring system. 4,023,549, Cl. 123-198.00D.
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Higgens, Calvin E.; and Michel, Karl H., to Eli Lilly and Company. Antibiotic A-22082 and process for production thereof. 4,024,246, Cl. 424-119.000.
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Houke, Howard F.; and Anderson, Freeman C., to Collins Machinery Corporation. Vapor cleaning system. 4,023,983, Cl. 134-11.000.
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Houston Engineers, Inc.: *See*—
Webb, Derrel D., 4,023,847.
Houston, George F., to Briggs & Stratton Corporation. Engine with overspeed prevention. 4,023,550, Cl. 123-198.00D.
Hovan, Edward John; and Bruetsch, Walter Ernest, to United Technologies Corporation. Exhaust case for a turbine machine. 4,023,350, Cl. 60-39.500.
Howard, Kate Johnson, executrix: *See*—
Bauer, William C.; and Howard, Richard Irving, deceased, 4,023,976.
Howard, Richard Irving, deceased: *See*—
Bauer, William C.; and Howard, Richard Irving, deceased, 4,023,976.
Howard, Wayne R.: *See*—
Holmes, Donald E.; Howard, Wayne R.; Fisher, John F.; and Zeller, Burton S., 4,023,638.
Hoyt, Charles D. Two axis attitude sensor. 4,023,278, Cl. 33-377.000.
Hrodey, Thomas E.: *See*—
Palmer, Richard D.; Barr, Jack R.; and Hrodey, Thomas E., 4,023,851.
Hruza nee Sanderson, Anne; Schreiber, William L.; van Praag, Michel; Pittet, Alan O.; and Evers, William J., to International Flavors & Fragrances Inc. Novel lower alkenals. 4,024,190, Cl. 260-601.00R.
Huddleston, Marvin J. Bow string silencer. 4,023,551, Cl. 124-92.000.
Hudgin, Donald E., to Atlantic Richfield Company. Process for preparing ethylene-carbon monoxide copolymers using peroxyesters having a ten-hour half-life lower than 60° C. 4,024,325, Cl. 526-11.100.
Hudgin, Donald E., to Atlantic Richfield Company. Process for preparing ethylene-carbon monoxide copolymers using a peroxydicarbonate catalyst. 4,024,326, Cl. 526-11.100.
Huffman, Erline L. Adjustable visored cap with interchangeable crown. 4,023,212, Cl. 2-197.000.
Hughes, Arleigh Bruce. Bacteria identification device. 4,024,530, Cl. 340-332.000.
Hughes, Charles Durant. Sewage clarifier system. 4,024,060, Cl. 210-197.000.
Hughes, Lionel S., to British Steel Corporation. Thermally insulating material. 4,023,322, Cl. 52-608.000.
Huguenot, Pierre: *See*—
Niederhauser, Marc; and Huguenot, Pierre, 4,023,910.
Huignard, Jean-Pierre; and Micheron, Francois, to Thomson-CSF. Optical system for the storage of selectively erasable binary data arranged in the form of holographically recorded pages. 4,024,513, Cl. 340-173.0LT.
Hummeldorf, James L.: *See*—
Mueller, Anthony A.; Bao, Frank W.; Parker, Stephen D.; and Hummeldorf, James L., 4,024,395.
Hundstad, Richard L.: *See*—
Farish, Owen; and Hundstad, Richard L., 4,024,465.
Hungerer, Klaus-Dieter, to Hoechst Aktiengesellschaft. Substance having immunological activity and process for its manufacture. 4,024,242, Cl. 424-88.000.
Hupp, Gerhard; and Mader, Helmut, to Industriewerke Karlsruhe-Augsburg Aktiengesellschaft. Firearm construction having mechanical means for the ejection of misfired cartridges. 4,023,295, Cl. 42-25.000.
Hurd, Audrey Grant, to Burlington Industries, Inc. Oscillating valve for jet dye beck. 4,023,385, Cl. 68-62.000.
Hurlock, John R.: *See*—
Slovinsky, Manuel; and Hurlock, John R., 4,024,097.
Hurst, Autry E. Methods of fastening wood veneer sheets in edge-to-edge relationship. 4,023,256, Cl. 29-433.000.
Hurst, Robert C.: *See*—
Kulbida, Ihor; Kalvitis, Robert E.; and Hurst, Robert C., 4,023,901.
Hurwitz, Peter Alan: *See*—
Loersch, Joseph Frederick; Hurwitz, Peter Alan; and Jordan, Lester Warren, 4,023,966.
Hutchinson, Florence M., executrix: *See*—
Hutchinson, William Milton, deceased, 4,024,086.
Hutchinson, William Milton, deceased (by Hutchinson, Florence M., executrix), to Phillips Petroleum Company. Constant boiling admixtures. 4,024,086, Cl. 252-162.000.
Hy-Gain Electronics Corporation: *See*—
Dantzler, Danny M., 4,023,871.
Hynecek, Jaroslav; Ko, Wen H.; and Yon, Eugene T., to Case Western Reserve University. Miniature pressure transducer for medical use and assembly method. 4,023,562, Cl. 128-2.05E.
I & H Conveying and Machine Company: *See*—
Ittner, Delbert J.; and Hofstetter, Robert W., 4,023,692.
ICI United States Inc.: *See*—
Kruse, Walter M., 4,024,193.
Idai, Tsutomu: *See*—
Miyake, Hiroshi; Iriuchijima, Makoto; Takahashi, Eiji; Terata, Kiyoshi; Kamiyama, Hiroki; Kurihara, Masami; Suzuki, Etsuo; and Idai, Tsutomu, 4,024,076.
Ikawa, Junzo; Aramaki, Tokuji; and Naitoh, Yasuo, to Matsushita Electric Industrial Co., Ltd. Antenna mount for receiver cabinet. 4,024,542, Cl. 343-702.000.
Ikeda, Akira: *See*—
Nomura, Giichiro; Ando, Takuo; Ariga, Keiji; Ikeda, Akira; Saijo, Kinji; and Sato, Taizo, 4,023,987.
Ikemi, Tadashi: *See*—
Okuyama, Toshiki; Kawagoshi, Sakae; Ikemi, Tadashi; and Shimonuri, Kiyomi, 4,024,079.

Ikoma, Hidenobu: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,024,282.

Ilel, Eliesser Persiado: *See—*
Enchev, Ivan Dimitrov; Ilel, Eliesser Persiado; Kunchev, Nikola Tzanov; Harizanov, Kiril Georgiev; Genevski, Vladimir Vetov; Draganov, Nedelcho Draganov; Haralampiev, Georgi Alexandrov; Smilenov, Todor Ivanov; Stoyanov, Yossif Genchev; and Alexandrov, Alexander Minchev, 4,024,035.

Imaizumi, Fumitake; Nagaoka, Isao; Kurokawa, Mitsuo; Komatsu, Koei; Takimoto, Yasuyuki; and Kusuda, Hidefumi, to Japan Synthetic Rubber Co., Ltd. Photosensitive composition using maleic anhydride adduct of a 1,2 polybutadiene. 4,023,973, Cl. 96-115.00R.

Imamura, Juichi: *See—*
Ohta, Nobuto; Imamura, Juichi; and Matsuzaki, Takehiko, 4,024,180.

Imamura, Yoshiaki, to Mitsubishi Jukogyo Kabushiki Kaisha. Impact absorbing, overload protection apparatus for machine tool. 4,023,430, Cl. 74-412.0TA.

Imamura, Youichi, to Kabushiki Kaisha Suwa Seikosha. Electronic timepiece. 4,023,345, Cl. 58-39.500.

Imperial Chemical Industries Limited: *See—*
Allen, John Graham, 4,024,150.
Burnham, David Robert, 4,024,202.
Clementson, John Joseph; and Horvath, Arisztid Lajos, 4,023,984.
Moilliet, John Lewis; and Ryan, James Ernest, 4,024,089.
Shaw, Bryan; and Winterton, Neil, 4,023,951.
Swallow, Douglas Lintin, 4,024,183.
Wooler, Alan Metcalf; and Allport, Dennis Charlton, 4,024,310.

Indra, Jaromir, to Vysoke uceni technicke. Cylinder-cylinder head mounting arrangement for diesel-type fuel injection pumps. 4,023,916, Cl. 417-570.000.

Industriewerke Karlsruhe-Augsburg Aktiengesellschaft: *See—*
Hupp, Gerhard; and Mader, Helmut, 4,023,295.

Infranor S.A.: *See—*
Shindler, Harry, 4,023,219.

Ing. C. Olivetti & C., S.p.A.: *See—*
Lesca, Piercarlo; and Bonzano, Giorgio, 4,024,581.
Mercurio, Luigi; and Badagnani, Guido, 4,024,503.
Perucca, Vincenzo, 4,023,662.

Ing, Samuel W., to Xerox Corporation. Coater hardware and method for obtaining uniform photoconductive layers on a xerographic photoreceptor. 4,023,523, Cl. 118-49.100.

Ingels, George W. Apparatus for motor vehicle position indication. 4,024,493, Cl. 340-23.000.

Ingersoll-Rand Company: *See—*
Clapp, John Madison; and Pauley, Reginald William, 4,023,627.

Ingle, Edwin Coy, to Bell Telephone Laboratories, Incorporated. Telephone line battery boost circuit. 4,024,351, Cl. 179-16.00F.

Ingley, Herbert A.: *See—*
Pitts, Clyde T.; Ingley, Herbert A.; Farber, Erich A.; and Morrison, Clayton A., 4,023,948.

Inland Steel Company: *See—*
Jackson, Charles Richard, 4,023,612.

Innotech Corporation: *See—*
Merrin, Seymour, 4,024,558.

Inoue, Eiichi: *See—*
Ohno, Genji; and Inoue, Eiichi, 4,023,898.

Inoue, Nobuyoshi, to Copal Company Limited. Focal plane shutter for cameras. 4,024,555, Cl. 354-249.000.

Inoue, Nobuyoshi; and Shimizu, Munetaka, to Copal Company Limited. Signaling arrangement for an electrical shutter. 4,024,556, Cl. 354-266.000.

Inoue, Yoshio: *See—*
Takamizawa, Minoru; Abe, Akira; Inoue, Yoshio; and Yoshioka, Hiroshi, 4,024,306.

Inskip, Thomas C. Firearm. 4,023,465, Cl. 89-131.000.

Instapak Corporation: *See—*
Sperry, Charles R., 4,023,733.

Institut Francais du Petrole: *See—*
Torck, Bernard; Vidouta, Georges; Pariot, Peirre; and Hellin, Michel, 4,024,203.

Institute of Gas Technology: *See—*
Schora, Frank C.; Loeding, John W.; and Patel, Jitendra G., 4,023,280.

Institute po Phisikohimia pri Bulgarska Akademia na Naukite: *See—*
Burov, Atanas Tzvetanov; Simidjieva, Penka Atanasova; Stoicheva, Rumyana Toteva; and Malinovski, Jordan Petrov, 4,024,030.

International Business Machines Corporation: *See—*
Alonso, Victor Manuel; Cialone, David Roy; Ducharme, George Romeo; and Ginnings, Paul Douglas, 4,024,548.
Alpaugh, Warren Alan; and Summa, William Joseph, 4,024,305.
Bajorek, Christopher Henry; Hempstead, Robert Douglas; Krongelb, Sol; and Mayadas, Ashok Frank, 4,024,489.
Berlier, Richard Allen; and Brown, Augustus Boyd, 4,023,421.
Clark, William D., 4,023,897.
Croisier, Alain; and Desblache, Andre Eugene, 4,024,342.
Foster, Luther Morris; and Scardefield, John Edward, 4,024,214.
Ghatalia, Ashwin Kantilal, 4,024,561.
Hatzakis, Michael, 4,024,293.
Herbst, Noel Martin; and Morrissey, John Henry, 4,024,500.
Heuber, Klaus; Najmann, Knut; Remshardt, Rolf; and Tertel, Klaus, 4,024,417.
Highnote, Jerry Lee; and O'Day, Richard Lewis, 4,024,462.
Pearson, Robert Charles, 4,024,510.
Suits, James Carr, 4,023,965.

International Flavors & Fragrances Inc.: *See—*
Evers, William J.; Heinsohn, Howard H., Jr.; and Vock, Manfred Hugo, 4,024,289.
Hruza nee Sanderson, Anne; Schreiber, William L.; van Praag, Michel; Pittet, Alan O.; and Evers, William J., 4,024,190.

International Harvester Company: *See—*
Matalonis, Charles V.; and Bott, Edward A., 4,023,827.

International Paper Company: *See—*
MacDonald, Donald M.; and Deed, Lee H., 4,024,311.
Royal, Thomas B., 4,023,471.

International Standard Electric Corporation: *See—*
Dobler, Karl U., 4,023,753.

International Telephone and Telegraph Corporation: *See—*
Kivi, Aare, 4,024,481.
November, Milton H., 4,023,400.
Powell, Lloyd J., 4,023,880.

Inukai, Mitsuo: *See—*
Kokubo, Yukio; and Inukai, Mitsuo, 4,023,826.

Irick, Gether, Jr.: *See—*
Wang, Richard Hsu-Shien; and Irick, Gether, Jr., 4,024,153.

Iriuchijima, Makoto: *See—*
Miyake, Hiroshi; Iriuchijima, Makoto; Takahashi, Eiji; Terata, Kiyoshi; Kamiyama, Hiroki; Kurihara, Masami; Suzuki, Etsuo; and Idai, Tsutomu, 4,024,076.

Ise, Masahiro: *See—*
Kanatani, Yoshiharu; Ise, Masahiro; and Mizukami, Etsuo, 4,024,389.

Ishigami, Toshihiko: *See—*
Higashi, Tadatoshi; Yoshimoto, Mitsunori; Hagiwara, Mituharu; and Ishigami, Toshihiko, 4,024,425.

Ishikawa, Yoshikazu, to Nissan Motor Co., Ltd. Rotary piston internal combustion engine with a stratified charge intake port system. 4,023,534, Cl. 123-8.130.

Ishikawa, Yoshikazu, to Nissan Motor Co., Ltd. Rotary piston internal combustion engine with a stratified charge intake port system. 4,023,535, Cl. 123-8.130.

Ishikawa, Yoshikazu, to Nissan Motor Co., Ltd. Internal combustion engine. 4,023,543, Cl. 123-75.00B.

Ishizaka, Akitoshi: *See—*
Iwata, Seiichi; Ishizaka, Akitoshi; and Yamamoto, Hiroshi, 4,024,567.

Isoard, Bernard, to Rhone-Poulenc-Textile. Method and apparatus for detecting the presence of yarns. 4,023,399, Cl. 73-37.700.

Ito, Yoshizo: *See—*
Yoshida, Shoji; Ito, Yoshizo; Sakasita, Yoshihiro; and Kobata, Tatsuhiko, 4,024,039.

Ito, Yukiaki: *See—*
Hotta, Seiji; and Ito, Yukiaki, 4,024,157.

ITT Industries, Inc.: *See—*
Stahl, Torvald, 4,023,918.

Ittner, Delbert J.; and Hofstetter, Robert W., to I & H Conveying and Machine Company. Apparatus for opening and unloading cartons. 4,023,692, Cl. 214-304.000.

Ivett, Peter Robert; Tooth, Christopher; and Davis, Leslie Charles, to U.S. Philips Corporation. Semiconductor device manufacture. 4,023,725, Cl. 228-123.000.

Iwata, Seiichi; Ishizaka, Akitoshi; and Yamamoto, Hiroshi, to Hitachi, Ltd. Semiconductor device having Al-Mn or Al-Mn-Si alloy electrodes. 4,024,567, Cl. 357-67.000.

Iwatsu Electric Co., Ltd.: *See—*
Hijikata, Tokuhisa, 4,024,353.

Izumi, Hisashi, to Nissan Motor Company Limited. Steam engine for a motor vehicle. 4,023,367, Cl. 60-693.000.

J. H. Horne & Sons, Inc.: *See—*
Gordon, John Herbert; and Duchnowski, Frank A., 4,024,016.

J. I. Case Company: *See—*
Bennett, Wilbur G., 4,023,848.
Frisbee, Claude M., 4,023,624.
Levin, Daniel R., 4,023,636.

Jackovich, Melvin Claude, to Sundstrand Corporation. Programmable electronic tracking control for vehicles with hydrostatic transmissions. 4,023,637, Cl. 180-6.480.

Jackson, Charles Richard, to Inland Steel Company. Continuous casting mold and process of casting. 4,023,612, Cl. 164-82.000.

Jackson, James W., to Bird & Son, Inc. Ornamental plastic shutter. 4,023,320, Cl. 52-473.000.

Jackson, Julius, to Du Pont de Nemours, E. I., and Company. Manufacture of copper phthalocyanine pigment via aqueous milling. 4,024,154, Cl. 260-314.500.

Jackson, P. C.: *See—*
Garcia, George E., 4,023,415.

Jackson, Robert G.: *See—*
Carlson, Jon R.; and Jackson, Robert G., 4,023,617.

Jadoul, Desire J. N.: *See—*
Alfenaar, Marinus; and Jadoul, Desire J. N., 4,024,033.

Jago, Edward John; and Cooley, Kenton Parkes, to Foseco Trading A.G. Lining cavities with heat insulating material. 4,024,007, Cl. 156-212.000.

Janata, Shirleen J.; and Janata, Thomas A. Glare shield. 4,023,855, Cl. 296-97.00C.

Janata, Thomas A.: *See—*
Janata, Shirleen J.; and Janata, Thomas A., 4,023,855.

Janda, Robert J., to Gammaflux, Inc. Method and apparatus for drying moldable resins. 4,023,279, Cl. 34-1.000.

Janes, George S.; and Litzenberger, Leonard N., to Jersey Nuclear-Avco Isotopes, Inc. Method and apparatus for measuring vapor flow in isotope separation. 4,024,399, Cl. 250-423.00P.

Janes, Norman Frank: *See—*
Elliott, Michael; Janes, Norman Frank; and Pulman, David Allen, 4,024,163.

Janotik, Adam M.: *See—*
Stickels, Charles A.; Anderson, Anthony T.; and Janotik, Adam M., 4,023,988.

Japan Exlan Company Limited: *See—*
Kishimoto, Soichiro; and Okazaki, Saburo, 4,024,227.

Japan Synthetic Rubber Co., Ltd.: *See—*
Imaizumi, Fumitake; Nagaoka, Isao; Kurokawa, Mitsuo; Komatsu, Koei; Takimoto, Yasuyuki; and Kusuda, Hidefumi, 4,023,973.

Jasinski, Stanley K.; and Odorico, Frank A., to Eaton Yale Ltd. Tree top ejector. 4,023,603, Cl. 144-2.00Z.

Jean Walterscheid GmbH: *See—*
Geisthoff, Hubert; and Nienhaus, Clemens, 4,023,822.

Jenkins, William A., to Monarch Marking Systems, Inc. Label printing and applying apparatus. 4,024,005, Cl. 156-384.000.

Jensen, Charles Albert: *See—*
Bettger, Lloyd Erwin; and Jensen, Charles Albert, 4,023,317.

Jensen, Ole Roger; and Kobbero, Preben, to Automaticon A/S. Polyethylene urine bag with tube. 4,023,607, Cl. 150-1.000.

Jensen, Thomas H., to PPG Industries, Inc. Split bushing control. 4,024,336, Cl. 13-6.000.

Jentzsch, Arndt: *See—*
Johne, Hans; Jentzsch, Arndt; and Schumann, Gunter, 4,023,423.

Jepson, John W.; Reid, Walter; and Brown, Robert A., to Acushnet Company. Golf club wood. 4,023,802, Cl. 273-80.500.

Jersey Nuclear-Avco Isotopes, Inc.: *See—*
Janes, George S.; and Litzenberger, Leonard N., 4,024,399.

Johansson, Karl-Erik: *See—*
Lampe, Vaino; and Johansson, Karl-Erik, 4,023,739.

John Thomas Batts, Inc.: *See—*
Batts, John H.; and Duester, Everett L., 4,023,762.

John Wyeth & Brother Limited: *See—*
Archibald, John Leheup, 4,024,147.

John Zink Company: *See—*
Cantrell, Clifford J., Jr.; and Hanlon, Gary D., 4,023,508.

Johne, Hans; Jentzsch, Arndt; and Schumann, Gunter, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Variable-stroke and frequency drive. 4,023,423, Cl. 74-96.000.

Johns Hopkins University, The: *See—*
Rabenhorst, David W., 4,023,437.
Ts'o, Paul O. P.; and Carter, William A., 4,024,222.

Johnson, James P.: *See—*
Herring, William M.; Johnson, James P.; and Walling, Dennis B., 4,024,501.

Johnson, John H.: *See—*
Weiss, Stefan A.; and Johnson, John H., 4,024,020.

Johnson & Johnson: *See—*
Korpman, Ralf, 4,024,312.

Johnson, LeRoy E. Seeder with seed flow modification for marking seeded fields. 4,023,707, Cl. 222-1.000.

Johnson, Michael R.: *See—*
Bindra, Jasjit S.; and Johnson, Michael R., 4,024,179.

Johnson, Philip M.; and Northrup, Richard M., to Sanders Associates, Inc. Direction determining method and apparatus. 4,023,908, Cl. 356-152.000.

Johnson, Robert Leonard: *See—*
Chandler, Bruce Veness; and Johnson, Robert Leonard, 4,024,334.

Johnson, Ronald: *See—*
Yarrow, Christopher John; and Johnson, Ronald, 4,024,455.

Joly, Michel; and Tabet, Jean-Noel, to Sogemaric. Device for mixing chemical products with tap water. 4,023,778, Cl. 259-4.00R.

Jonas, Gerhard: *See—*
Guth, Hans; Jonas, Gerhard; Kleine-Weischede, Klaus; Wieschen, Hermann; Kaiser, Hans-Joachim; Dorr, Karl-Heinz; and Grimm, Hugo, 4,023,938.

Jones & Laughlin Steel Corporation: *See—*
Pollard, Bernard Robert, 4,023,614.

Jones, William H., to Eaton Corporation. Pressure switch mechanism and cam stop arrangement therefor. 4,024,364, Cl. 200-83.00S.

Jong, Howard W.; and McDonell, Maurice F., to McDonnell Douglas Corporation. Oxygen mask stowage. 4,023,874, Cl. 312-291.000.

Jonnet, Albert G., to Koppers Company, Inc. Apparatus and method for transferring hot coke to a dry coke cooler. 4,024,023, Cl. 201-39.000.

Joosten, Louis Gerardus Josephus; Bosboom, Wim; Hetterscheid, Wilhelmus Theodorus Hendrikus; and Van Schaik, Gerrit Pieter Johannes, to U.S. Philips Corporation. Circuit arrangement in a television receiver provided with a line deflection circuit and a switched supply voltage circuit. 4,024,434, Cl. 315-410.000.

Jordan, Lester Warren: *See—*
Loersch, Joseph Frederick; Hurwitz, Peter Alan; and Jordan, Lester Warren, 4,023,966.

Jordan, Peter Anthony: *See—*
Underhill, Michael James; and Jordan, Peter Anthony, 4,024,464.

Jorgensen, Dale E. Decoy products for game birds with compact nesting facilities. 4,023,297, Cl. 43-3.000.

Joseph, Raymond, to Ateliers Reunis Societe Anonyme. Handling container, notably pallet tote or heightening box. 4,023,698, Cl. 220-7.000.

Josephson, Joseph P. Chart device. 4,023,290, Cl. 40-125.00F.

Joswig, Siegfried: *See—*
Achenbach, Dieter; Joswig, Siegfried; and Kolb, Walter, 4,023,332.

Jou, Chiou Ming; and Kung, Yang Youn. Interior and outer wiper of car. 4,023,422, Cl. 74-70.000.

Juhlin, Lars-Erik: *See—*
Ekstrom, Ake; and Juhlin, Lars-Erik, 4,024,454.

Julesz, Bela; Kerns, Becky Thomas; and Terry, Milton Everett, to Bell Telephone Laboratories, Incorporated. Stereopsis test patterns for adjustment of stereomicroscopes in the inspection of three-dimensional objects. 4,023,911, Cl. 356-237.000.

Juntgen, Harald; Knoblauch, Karl; Grochowski, Horst; and Schwarte, Jurgen, to Bergwerksverband GmbH. Method and arrangement for purifying gases. 4,023,939, Cl. 55-73.000.

Kablaoui, Mahmoud S.; and Biasotti, Joseph B., to Texaco Inc. Substituted phenoxy propanol diamines and amino alcohol detergent additives for fuels and mineral oils. 4,024,083, Cl. 252-51.50R.

Kabushiki Kaisha Dawai Gakki Seisakusho: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,023,454.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Kuwahara, Toshikazu; Nishida, Ryokichi; and Kumagae, Kenji, 4,023,656.

Kabushiki-Kaisha Nishinishon Seiki Seisakusho: *See—*
Tomita, Shozo, 4,023,377.

Kabushiki Kaisha Suwa Seikosha: *See—*
Imamura, Youichi, 4,023,345.
Kubota, Kanemitsu; and Nagasaki, Jin, 4,023,259.
Mukaiyama, Fumiaki, 4,023,344.

Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See—*
Kokubo, Yukio; and Inukai, Mitsuo, 4,023,826.

Kabushiki Kaisha Toyoda Jideshokki Seisakusho: *See—*
Sakamoto, Akehiro; and Watanabe, Yoshio, 4,023,541.
Tooka, Takuzo; Araki, Hidejiro; Mori, Mitsuo; Nakane, Katumi; and Morishita, Toshio, 4,023,338.

Kabushiki Kaisha World Chemical: *See—*
Mori, Youzi, 4,024,063.

Kaderabek, Evzen: *See—*
Cech, Bohuslav; Kaderabek, Evzen; and Hanslik, Tomas, 4,024,068.

Kagawa, Hiroshi, to Agency of Industrial Science & Technology. Sodium-sulfur storage battery. 4,024,319, Cl. 429-104.000.

Kaiser, Carl: *See—*
Colella, Donald F.; and Kaiser, Carl, 4,024,281.

Kaiser, Hans-Joachim: *See—*
Guth, Hans; Jonas, Gerhard; Kleine-Weischede, Klaus; Wieschen, Hermann; Kaiser, Hans-Joachim; Dorr, Karl-Heinz; and Grimm, Hugo, 4,023,938.

Kaiser, Mark E.; and Owen, Peter W., to Dow Chemical Company, The. Preparation of N-(2-alkoxyethyl)alkanamides and 2-alkoxyethyl amines from 2-oxazolines. 4,024,184, Cl. 260-561.00R.

Kalkhoven, Allen B.: *See—*
Harris, James R.; and Kalkhoven, Allen B., 4,023,590.

Kalvitis, Robert E.: *See—*
Kulbida, Ihor; Kalvitis, Robert E.; and Hurst, Robert C., 4,023,901.

Kametani, Tetsuji: *See—*
Partyka, Richard Anthony; Gordon, Maxwell; Kametani, Tetsuji; and Kigasawa, Kazuo, 4,024,082.

Kameyama, Seiji: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,023,454.

Kamii, Norimasa; Yamamoto, Choshiro; and Terakado, Ryoji, to Nippon Steel Corporation. Method of and apparatus for controlling the shape of rolled objects in the rolling of plate, sheet, strip and the like. 4,023,391, Cl. 72-200.000.

Kamino, Toshihide, to Terasaki Denki Sangyo Kabushiki Kaisha. Self-restoring type current limiting device. 4,024,488, Cl. 337-114.000.

Kamiyama, Hiroki: *See—*
Miyake, Hiroshi; Iriuchijima, Makoto; Takahashi, Eiji; Terata, Kiyoshi; Kamiyama, Hiroki; Kurihara, Masami; Suzuki, Etsuo; and Idai, Tsutomu, 4,024,076.

Kanatani, Yoshiharu; Ise, Masahiro; and Mizukami, Etsuo, to Sharp Kabushiki Kaisha. Photo-image memory panel and activating method therefor. 4,024,389, Cl. 250-213.00R.

Kaneda, Tsugio: *See—*
Fujita, Tatsu; Yamada, Yoshiro; Mizuta, Atsuo; Yamada, Tetsuo; Tsuda, Osamu; Kaneda, Tsugio; Shimazu, Shinichi; and Wada, Yukio, 4,023,392.

Kaneko, Keeji: *See—*
Aoyama, Keiichi; Kaneko, Keeji; Muramatsu, Katsuji; and Fututagawa, Ikuo, 4,024,557.

Kang, Chunghee K.: *See—*
Beuk, Jack F.; Warner, William D.; and Kang, Chunghee K., 4,024,285.

Kani, Akira: *See—*
Fukunaga, Ichiro; Kani, Akira; and Sakanishi, Shuji, 4,023,876.

Kankaanpaa, Matti, to Valmet Oy. Web-forming method and apparatus. 4,024,015, Cl. 162-203.000.

Kano, Saburo: *See—*
Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; Kano, Saburo; and Nomura, Osami, 4,024,252.

Kanzaka, Yoshihiro, to Yoshida Kogyo Kabushiki Kaisha. Top end construction for slide fasteners. 4,023,241, Cl. 24-205.11F.

Kark, Michael F.: *See—*
Sproul, Nolte V.; and Kark, Michael F., 4,023,250.

Karle, Dennis W.: *See—*
Paciorek, Kazimiera J. L.; Kratzer, Reinhold H.; and Karle, Dennis W., 4,024,067.

Karran, David D.: *See—*
Chinnappa, James C. V.; and Karran, David D., 4,023,375.

Kasem, Mohammad A.: *See—*
Shane, Hugh J. S.; Schell, Frederick S.; and Kasem, Mohammad A., 4,024,072.

Kason Hardware Corporation: *See—*
Berkowitz, Irving L., 4,023,913.

Kassai Co., Ltd.: *See—*
Kassai, Kenzo, 4,023,825.

Kassai, Kenzo, to Kassai Co., Ltd. Stroller. 4,023,825, Cl. 280-649.000.

Kastosov, Alexandr Andreevich: *See—*
Tochilkin, Anatoly Andreevich; Pshirkov, Vladilen Filippovich; Vigdorchik, Semen Abramovich; Vorobiev, Igor Andreevich; Petrikov, Viktor Grigorievich; and Kastosov, Alexandr Andreevich, 4,023,225.

Kasuya, Takanori: *See—*
Ban, Itsuki; Nozaki, Sumio; Kasuya, Takanori; Shinkado, Yukio; and Yano, Kanji, 4,024,582.

Kathawala, Faizulla G., to Sandoz, Inc. Preparation of aryl-butadienoic acids. 4,024,182, Cl. 260-521.00R.

Kato, Nobuyuki: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 4,023,991.

Kato, Takao: *See—*
Anzai, Nobuo; and Kato, Takao, 4,023,655.

Kato, Toshio: *See—*
Furukawa, Toshiyuki; and Kato, Toshio, 4,023,276.

Katona, Joseph W., to Mills Products, Inc. Self-contained window unit for oven doors. 4,023,554, Cl. 126-198.000.

Kats, Arnold Yakovlevich; Dubosarsky, Georgy Pavlovich; Zakhvatkin, Dmitry Pavlovich; Burda, Iosif Kharitonovich; Mezentsev, Sergei Afanasievich; Barshtak, Natan Mironovich; and Chernykh, Jury Vladimirovich. Throttle. 4,023,594, Cl. 138-43.000.

Kauer, James Charles, to Du Pont de Nemours, E. I., and Company. Aroylcrownethers. 4,024,158, Cl. 260-340.300.

Kawagoshi, Sakae: *See—*
Okuyama, Toshiki; Kawagoshi, Sakae; Ikemi, Tadashi; and Shimonuri, Kiyomi, 4,024,079.

Kawahara, Sei: *See—*
Takagi, Akira; Kawahara, Sei; and Takeda, Hideo, 4,024,302.

Kawakami, Kazuhiko, to Hitachi, Ltd. Distributor for an internal combustion engine. 4,023,546, Cl. 123-148.0DS.

Kayahara, Kenji: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Kayahara, Kenji, 4,024,253.

Kayanuma, Akio: *See—*
Shimada, Takashi; Saiki, Shinishi; and Kayanuma, Akio, 4,024,564.

Kayser, William M. Wrist watch with time display control switch. 4,023,346, Cl. 58-50.00R.

Keeny, Thomas R., to Molins Machine Company, Inc. Double facer platen. 4,023,481, Cl. 100-93.00P.

Keerl, Karl Heinz: *See—*
Maurer, Helmut; and Keerl, Karl Heinz, 4,023,358.

Kehe, Henry J.: *See—*
Morningstar, Marion G.; and Kehe, Henry J., 4,024,330.

Keigler, John Edward: *See—*
Pistiner, Josef Siegfried; Muhlfelder, Ludwig; and Keigler, John Edward, 4,023,752.

Keil, Klaus: *See—*
Hartmann, Gunter; Schwarz, Joachim-Ullrich; and Keil, Klaus, 4,024,570.

Kelly, Donald A. High density-third dimension geometry solar panels. 4,023,368, Cl. 60-698.000.

Kelsey-Hayes Company: *See—*
Drake, Charles J., 4,024,371.

Kempton, Marvin L., to United States of America, Navy. Metallic-fuel-enhanced, focused-gas warhead. 4,023,492, Cl. 102-66.000.

Kenco Alloy & Chemical Co. Inc.: *See—*
Wolfgram, Edgar W., 4,023,931.

Kendall, Samuel E.: *See—*
Austin, Carl F.; Halsey, Carl C.; and Kendall, Samuel E., 4,023,493.

Kennedy, Thomas E.; Butts, Earl E.; and Steelman, Melvin W., to Tyler Refrigeration Corporation. Refrigeration system incorporating a single air circulation means for a combination refrigerated display case and walk-in cooler. 4,023,378, Cl. 62-256.000.

Kenney, William J.: *See—*
Friedman, Jack S.; and Kenney, William J., 4,023,230.

Kennington, Frank William; and Dimitracopoulos, Panayotis Constantine, to Precision Mechanical Developments Ltd. Motion transmitting devices. 4,023,440, Cl. 74-804.000.

Kentrox Industries, Inc.: *See—*
McDermott, Noel C., 4,024,346.

Kerby, William S. Pressurized water wheel. 4,023,915, Cl. 415-2.000.

Kern, Edmund R., to North American Philips Corporation. Electric discharge tube having variable electrode area. 4,024,423, Cl. 313-147.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
Luhleich, Hartmut; Nickel, Hubertus; Pflaum, Peter; and Dias, Francesco, 4,023,979.
Zimmermann, Ulrich, 4,024,054.

Kerns, Becky Thomas: *See—*
Julesz, Bela; Kerns, Becky Thomas; and Terry, Milton Everett, 4,023,911.

Kessler, Frank Lee. Swimming pool construction. 4,023,217, Cl. 4-172.190.

Kessler, Saul, to Aidlin, Joseph W. Chemical surface coating bath. 4,023,986, Cl. 148-6.14R.

Keystone International, Inc.: *See—*
Killian, Henry R., 4,023,432.

Khadzhi, Valentin Evstafievich; and Reshetova, Galina Vasilievna. Method of producing citrine crystals. 4,024,013, Cl. 156-623.00Q.

Kibbel, William H., Jr., to FMC Corporation. Rapidly-soluble sodium dichloroisocyanurate dihydrate tablet. 4,024,257, Cl. 424-249.000.

Kidd, Harold J.: *See—*
Bernstein, Stanley; Griswa, Philip J.; Halter, Paul, Jr.; and Kidd, Harold J., 4,024,403.

Kigasawa, Kazuo: *See—*
Partyka, Richard Anthony; Gordon, Maxwell; Kametani, Tetsuji; and Kigasawa, Kazuo, 4,024,082.

Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, to Mitsubishi Chemical Industries Ltd. Pharmaceutically active 2-(3-alkylaminopropoxy)diphenylmethanes. 4,024,282, Cl. 424-330.000.

Killian, Henry R., to Keystone International, Inc. Actuator having universal-type joint assembly. 4,023,432, Cl. 74-424.8VA.

Killion, Donald C., to Killion, Rose, a part interest. Tensioned and retractable truck body tarpaulin. 4,023,857, Cl. 296-98.000.

Killion, Rose: *See—*
Killion, Donald C., 4,023,857.

Kim, Leo: *See—*
Shryne, Thomas M.; and Kim, Leo, 4,024,165.

Kimmel, Hans, to Gunther Papenmeier KG, Maschinen-und Apparatebau. Mixer with rotating mixing container. 4,023,777, Cl. 259-3.000.

Kingmann-White, Inc.: *See—*
Raahauge, Jerald Carl, 4,024,547.

Kinnamon, James Robert. Concrete floor forming system. 4,023,765, Cl. 249-29.000.

Kipple, Harry P.; Alke, Roger J.; Coppage, John R.; Price, Charles E.; and Sturman, Brian J., Jr., to Westinghouse Electric Corporation. Filter system. 4,023,943, Cl. 55-304.000.

Kirby, Raymond L., Jr., to Monarch Marking Systems, Inc. Printing apparatus. 4,023,485, Cl. 101-111.000.

Kirby, Raymond L., Jr., to Monarch Marking Systems, Inc. Ink fountain and supply system for a printing press. 4,023,491, Cl. 101-366.000.

Kirchlechner, Richard: *See—*
Rogalski, Werner; Kirchlechner, Richard; Seubert, Jurgen; Gottschlich, Rudolf; Steinigeweg, Rosmarie; Bergmann, Rolf; Wahlig, Helmut; and Gante, Joachim, 4,024,272.

Kirkwood, George T.; Castle, Patrick M.; and Whitney, John T., to Rodgers Organ Company. Organ stop switching system. 4,023,457, Cl. 84-1.170.

Kirstenpfad, Fritz; and Konning, Friedrich, to Demag, A.G. Strand support method. 4,023,610, Cl. 164-4.000.

Kishimoto, Soichiro; and Okazaki, Saburo, to Japan Exlan Company Limited. Process for producing carbon fibers having excellent properties. 4,024,227, Cl. 423-447.400.

Kitaguchi, Koji: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, 4,024,280.

Kivi, Aare, to International Telephone and Telegraph Corporation. Frequency drift compensation due to temperature variations in dielectric loaded cavity filters. 4,024,481, Cl. 333-82.0BT.

Kjellberg, Bengt Erik Sigvard: *See—*
Bjork, Anders Karl Konrad; Hernestam, Sven Erik Harry; and Kjellberg, Bengt Erik Sigvard, 4,024,264.

Klaenhammer, Bryan L.; and Long, William H., to Minnesota Mining and Manufacturing Company. Flashing retroreflecting device. 4,023,888, Cl. 350-99.000.

Klappert, Willi, to General Electric Company. Outer locking turn for precut core. 4,024,486, Cl. 336-210.000.

Klar, Norman: *See—*
Cohen, Seymour; Klar, Norman; and Schwartz, David, 4,023,235.

Klauke, Erich: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,023,958.

Kleimann, Helmut: *See—*
von Bonin, Wulf; Kleimann, Helmut; and Post, Udo, 4,024,090.

Kleine-Weischede, Klaus: *See—*
Guth, Hans; Jonas, Gerhard; Kleine-Weischede, Klaus; Wieschen, Hermann; Kaiser, Hans-Joachim; Dorr, Karl-Heinz; and Grimm, Hugo, 4,023,938.

Kleiner, Hans-Jerg: *See—*
Heinrich, Rudolf; and Kleiner, Hans-Jerg, 4,024,103.

Klemek, Samuel D. Shakable dispensing device. 4,023,714, Cl. 222-196.100.

Klemm, Wolf. Rotary piston engine. 4,023,917, Cl. 418-191.000.

Klinger, Dieter, to Mayer & Cie. Electrically controlled needle selector arrangement for knitting machines. 4,023,383, Cl. 66-50.00R.

Klioze, Solomon Samuel; and Bauer, Victor John, to American Hoechst Corporation. 1,3-Dihydrospiro[isobenzofuran-1,4'-piperidine]s. 4,024,263, Cl. 424-267.000.

Klochko, Viktor Alexandrovich: *See—*
Yakshin, Alexandr Sergeevich; Novikov, Oleg Nikolaevich; Grechinsky, Dmitry Alexeevich; Klochko, Viktor Alexandrovich; and Rygalin, Viktor Georgievich, 4,023,396.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Naumann, Wilhelm; Littmann, Wolfgang; and Aussem, Rudolf, 4,023,311.
Prasch, Johann, 4,023,548.
Wetteborn, Wilhelm, 4,024,208.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Zenker, Walter, 4,023,418.

Kloss, Henry E.: *See—*
Hergenrother, George R.; and Kloss, Henry E., 4,024,579.

Kluge, Werner: *See—*
Berkling, Klaus; and Kluge, Werner, 4,024,507.

Klymciw, Ihor: *See—*
Babiak, Ihor; and Klymciw, Ihor, 4,023,712.

Knabe, Bernd: *See—*
Druckrey, Eike; Knabe, Bernd; Lang, Hans-Jochen; Babej, Milos; and Muschaweck, Roman, 4,024,274.

Knappstein, Johannes, to Carl Still, Firma. Hopper for predried fine coal carried on hopper trucks for coking batteries. 4,024,024, Cl. 202-262.000.

Knauth, Hans H., to Sulzer Brothers Limited. Apparatus for the production of sugars from hemi-cellulose-containing raw materials. 4,023,982, Cl. 127-1.000.

Kneissl, Franz. Ice ax, and method and extrusion apparatus for the manufacture thereof. 4,023,606, Cl. 145-2.00R.

Knoblauch, Karl: *See—*
Juntgen, Harald; Knoblauch, Karl; Grochowski, Horst; and Schwarte, Jurgen, 4,023,939.

Knoche, Karl-Friedrich; Cremer, Helmut; and Steinborn, Gerhard. Producing hydrogen and oxygen by decomposition of water via the thermochemical iron-chlorine system. 4,024,230, Cl. 423-579.000.

Knopp, Joseph P. Safety device for firearms. 4,023,294, Cl. 42-1.0LP.

Ko, Wen H.: *See—*
Hynecek, Jaroslav; Ko, Wen H.; and Yon, Eugene T., 4,023,562.

Kobata, Tatsuhiko: *See—*
Yoshida, Shoji; Ito, Yoshizo; Sakasita, Yoshihiro; and Kobata, Tatsuhiko, 4,024,039.

Kobayashi, Kesanao; and Matsumoto, Hiroshi, to Fuji Photo Film Co., Ltd. Gum removing solution for lithographic plate. 4,024,085, Cl. 252-136.000.

Kobbero, Preben: *See—*
Jensen, Ole Roger; and Kobbero, Preben, 4,023,607.

Kobe Steel Ltd.: *See—*
Fujita, Tatsu; Yamada, Yoshiro; Mizuta, Atsuo; Yamada, Tetsuo; Tsuda, Osamu; Kaneda, Tsugio; Shimazu, Shinichi; and Wada, Yukio, 4,023,392.
Nishihara, Masao; Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Yamasaki, Tatsuo; Noguchi, Masataka; and Nishioka, Kunihiko, 4,023,390.

Kobzina, John W., to Chevron Research Company. s-Triazines. 4,024,141, Cl. 260-249.800.

Koch, Robert M., to Addressograph Multigraph Corporation. Clean margin mechanism for electrostatic copiers. 4,023,896, Cl. 355-3.00R.

Koch, Wolfgang, to Hoffmann-La Roche Inc. Benzazepinyl sulfonylureas and intermediates therefore. 4,024,128, Cl. 260-239.0BB.

Kochanowski, John E.: *See—*
Takekoshi, Tohru; and Kochanowski, John E., 4,024,101.

Kochem, Robert Clark, to Strom Industries International, Inc. Audio program and telephonic communication system. 4,024,345, Cl. 179-1.00B.

Kodaira, Yasuo; and Misaki, Nobuo, to Nihon Kaiheiki Industrial Company, Ltd. Rocker switch with slidable indicator. 4,024,367, Cl. 200-308.000.

Kodama, Teruo: *See—*
Nakamura, Osamu; Kodama, Teruo; Ogino, Isao; and Miyake, Yoshizo, 4,024,036.

Kojima, Hisatoshi. Orifice unit of a needle valve. 4,023,774, Cl. 251-205.000.

Kojima, Kiyoshi: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 4,023,991.

Kojima, Shigeru: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 4,023,991.

Kojima, Toshihiko. Catalyst for controlling poisonous exhaust gas. 4,023,361, Cl. 60-302.000.

Kokubo, Yukio; and Inukai, Mitsuo, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Tongue plate slidably fitted on safety seat belt in motor vehicle. 4,023,826, Cl. 280-747.000.

Kolb, Walter: *See—*
Achenbach, Dieter; Joswig, Siegfried; and Kolb, Walter, 4,023,332.

Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, to Bayer Aktiengesellschaft. Substituted phenylguanidines and processes for their preparation and use. 4,024,176, Cl. 260-470.000.

Komatsu, Koei: *See—*
Imaizumi, Fumitake; Nagaoka, Isao; Kurokawa, Mitsuo; Komatsu, Koei; Takimoto, Yasuyuki; and Kusuda, Hidefumi, 4,023,973.

Kompis, Ivan, to Hoffmann-La Roche Inc. Benzylpyrimidine derivatives. 4,024,145, Cl. 260-256.40N.

Kondo, Tatsunori: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,023,454.

Kondo, Toshihiro, to Kondo, Toshihiro; and Fuji Photo Film Co., Ltd. Electromagnetically driven optical blade. 4,024,552, Cl. 354-234.000.

Kondo, Yasuo: *See—*
Noguchi, Masaaki; Bunda, Tsuchio; Sumiyoshi, Masaharu; and Kondo, Yasuo, 4,023,539.

Konicek, Jiri K.: *See—*
Cederberg, Kjell A.; Konicek, Jiri K.; and Malm, Hans R., 4,023,998.

Konig, Wolfgang; Geiger, Rolf; and Sandow, Jurgen Kurt, to Hoechst Aktiengesellschaft. Peptides having LH-RH/FSH-RH activity. 4,024,248, Cl. 424-177.000.

Konishi, Yoshitaka: *See—*
Hayashi, Masaki; Kori, Seiji; Wakatsuka, Hirohisa; and Konishi, Yoshitaka, 4,024,174.

Konning, Friedrich: *See—*
Kirstenpfad, Fritz; and Konning, Friedrich, 4,023,610.

Konno, Isago: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 4,023,991.

Konsowski, Stephen G.: *See—*
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Koppers Company, Inc.: *See—*
Jonnet, Albert G., 4,024,023.

Kordon Corporation: *See—*
Rakowicz, Maurice R.; and Rodrigues, John J., 4,024,064.

Koreman, Cornelis W.: *See—*
Burrie, Peter H.; Dijstelbergen, Harmen H.; and Koreman, Cornelis W., 4,024,449.

Kori, Seiji: *See—*
Hayashi, Masaki; Kori, Seiji; Wakatsuka, Hirohisa; and Konishi, Yoshitaka, 4,024,174.

Korn, Bernard, to Raymond Lee Organization, Inc., The. Soundproof earcovers. 4,023,642, Cl. 181-33.00R.

Korpman, Ralf, to Johnson & Johnson. Pressure-sensitive adhesive tape having extensible and elastic backing composed of a block copolymer. 4,024,312, Cl. 428-343.000.

Kortvelyessy, Laszlo. High temperature heat insulation. 4,024,338, Cl. 13-20.000.

Korver, Jan Abraham Cornelis, to U.S. Philips Corporation. Circuit for generating a deflection current through a coil for the vertical deflection in a display tube. 4,024,433, Cl. 315-397.000.

Koyo Seiko Company, Limited: *See—*
Miki, Toshio, 4,023,868.

Kramer, Frederick A., Jr. Burner for heating an airstream. 4,023,923, Cl. 432-222.000.

Kramer, Hans, to Continental Gummi-Werke Aktiengesellschaft. Connection for the ends of supporting straps of an endless bar belt conveyor. 4,023,671, Cl. 198-728.000.

Krasser, Fritz; Peter, Josef; and Volkl, Rainer, to Ellenberger & Poensgen GmbH. Multipole excess current switch. 4,024,487, Cl. 337-46.000.

Kratzer, Reinhold H.: *See—*
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Krebitz, Josef: *See—*
Birkle, Hans Gerhard; and Krebitz, Josef, 4,023,438.

Krekeler, Hans; and Muller, Werner Heinrich, to Hoechst Aktiengesellschaft. Process for the manufacture of hydroquinone. 4,024,196, Cl. 260-621.00H.

Krenzer, John, to Velsicol Chemical Corporation. Herbicidal 1-thiadiazolyl-5-carbamoyloxyimidazolidinones. 4,023,957, Cl. 71-90.000.

Kressel, Henry: *See—*
Hawrylo, Frank Zygmunt; and Kressel, Henry, 4,024,569.

Kreuz, Donald F.: *See—*
Caropreso, Frank E.; and Kreuz, Donald F., 4,024,215.

Krolak, Ronald L.; Alexander, George F.; and Oestmann, Eldon D., to Caterpillar Tractor Co. Structure mounting a bulldozer assembly to a vehicle. 4,023,625, Cl. 172-809.000.

Krongelb, Sol: *See—*
Bajorek, Christopher Henry; Hempstead, Robert Douglas; Krongelb, Sol; and Mayadas, Ashok Frank, 4,024,489.

Krusche, Peter; and Twillmann, Dieter, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Yarn reserve forming and moving apparatus. 4,023,336, Cl. 57-34.00R.

Kruse, Walter M., to ICI United States Inc. Homogeneous hydrogenation process. 4,024,193, Cl. 260-618.00D.

Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, to Matsushita Electric Industrial Co., Ltd. Anisotropic permanent magnet of Mn-Al-C alloy. 4,023,991, Cl. 148-120.000.

Kubota, Kanemitsu; and Nagasaki, Jin, to Kabushiki Kaisha Suwa Seikosha. Method of making liquid crystal display device having extended service life. 4,023,259, Cl. 29-592.000.

Kucheck, Leo: *See—*
Crankshaw, Michael; Kucheck, Leo; and Caudill, Donald Lee, 4,024,011.

Kuchenmeister, Rolf: *See—*
Kuhn, Peter; Raichle, Karl; Kuchenmeister, Rolf; and Peltzer, Bernd, 4,024,100.

Kugelfischer Georg Schafer & Co.: *See—*
Piller, Rudolf, 4,023,867.

Kugisawa, Toshio: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,023,454.

Kuhle, Engelbert: *See—*
Widdig, Arno; Kuhle, Engelbert; Thomas, Herbert; and Schulz, Hans Peter, 4,024,236.

Kuhn, Peter; Raichle, Karl; Kuchenmeister, Rolf; and Peltzer, Bernd, to Bayer Aktiengesellschaft. Polysiloxane modified coatings. 4,024,100, Cl. 260-30.40N.

Kuhnke, Horst F. Intonation aid for the violin, viola and cello and other instruments of the violin family. 4,023,460, Cl. 84-314.000.

Kukolja, Stjepan, to Eli Lilly and Company. 4-Dithio-3-imido-azetidin-2-ones. 4,024,152, Cl. 260-306.500.

Kulbida, Ihor; Kalvitis, Robert E.; and Hurst, Robert C., to Xerox Corporation. Reproduction machine service control. 4,023,901, Cl. 355-14.000.

Kumagae, Kenji: *See—*
Kuwahara, Toshikazu; Nishida, Ryokichi; and Kumagae, Kenji, 4,023,656.

Kumon, Hiroshi: *See—*
Uebayasi, Yositaka; Kumon, Hiroshi; Yamada, Michinobu; and Oe, Yoshikazu, 4,023,613.

Kun, Leslie C.; and Burr, Kit F., to Union Carbide Corporation. Heat exchanger headering arrangement. 4,023,618, Cl. 165-175.000.

Kunchev, Nikola Tzanov: *See—*
Enchev, Ivan Dimitrov; Ilel, Eliesser Persiado; Kunchev, Nikola Tzanov; Harizanov, Kiril Georgiev; Genevski, Vladimir Vetov; Draganov, Nedelcho Draganov; Haralampiev, Georgi Alexandrov; Smilenov, Todor Ivanov; Stoyanov, Yossif Genchev; and Alexandrov, Alexander Minchev, 4,024,035.

Kung, Yang Youn: *See—*
Jou, Chiou Ming; and Kung, Yang Youn, 4,023,422.

Kunstmann, Walter; and Ribka, Joachim, to Hoechst Aktiengesellschaft. Dis-azo pigments deriving from bis-diazotized diamino-2-phenyl-benzazolones. 4,024,125, Cl. 260-157.000.

Kupcikevicius, Vytautas; and Raudys, Vytas Andrew, to Union Carbide Corporation. Poultry packaging apparatus. 4,023,329, Cl. 53-259.000.

Kura, Kohei: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, 4,024,280.

Kurata, Masaharu; Tanigaichi, Mineaki; and Ohya, Kazuyuki, to Mitsubishi Gas Chemical Company, Inc. Phenolic resin composition for laminates. 4,024,094, Cl. 260-19.00N.

Kurata, Takao. Curtain wall assembly of interfitting glass blocks. 4,023,319, Cl. 52-308.000.

Kurihara, Masami: *See—*
Miyake, Hiroshi; Iriuchijima, Makoto; Takahashi, Eiji; Terata, Kiyoshi; Kamiyama, Hiroki; Kurihara, Masami; Suzuki, Etsuo; and Idai, Tsutomu, 4,024,076.

Kurio, Noriyuki: *See—*
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Kurokawa, Mitsuo: *See—*
Imaizumi, Fumitake; Nagaoka, Isao; Kurokawa, Mitsuo; Komatsu, Koei; Takimoto, Yasuyuki; and Kusuda, Hidefumi, 4,023,973.

Kusmer, Kasimir C., to Remsuk Ventures Limited. Varying force resisting type exercising device. 4,023,796, Cl. 272-137.000.

Kusuda, Hidefumi: *See—*
Imaizumi, Fumitake; Nagaoka, Isao; Kurokawa, Mitsuo; Komatsu, Koei; Takimoto, Yasuyuki; and Kusuda, Hidefumi, 4,023,973.

Kuwahara, Toshikazu; Nishida, Ryokichi; and Kumagae, Kenji, to Kabushiki Kaisha Komatsu Seisakusho. Wet type band brake apparatus. 4,023,656, Cl. 188-264.00B.

Kwiatkowski, J. A., to Ball Corporation. Single web edge contacting detecting apparatus. 4,024,524, Cl. 340-259.000.

Kyowa Electronic Instruments Co., Ltd.: *See—*
Watanabe, Osamu, 4,023,402.

L. & C. Steinmuller GmbH: *See—*
Clemens, Kurt; Wollenweber, Kurt; Bruninghaus, Hans; and Nies, Konrad, 4,023,611.

Labaz: *See—*
Pigerol, Charles; Chandavoine, Marie-Madeleine; de Fillain, Paul de Cointet; and Nanthavong, Souli, 4,024,155.

Laboratory Furniture, Inc.: *See—*
Russell, Walter, 4,023,473.

Laderach, Paul; Michalet, Charles; and Rigaud, Jean, to Rhone-Poulenc-Textile. Automatic loading, unloading and transfer device on spinning machines. 4,023,339, Cl. 57-53.000.

LaDue, Brian J., to General Motors Corporation. Snap fit bowden cable attachment. 4,023,435, Cl. 74-501.00P.

Lagsdin, Andry: *See—*
MacKenzie, Robert A.; and Lagsdin, Andry, 4,023,828.

Lah, Josef; and Gentile, Anthony M. Ski pole with warning device. 4,023,817, Cl. 280-11.37B.

Lainer, Abram Ilich, deceased: *See—*
Lainer, Jury Abramovich; Tagiev, Eldar Ismail Ogly; Nasyrov, Gakif Zakirovich; Zakharova, Valentina Ivanovna; Lainer, Abram Ilich, deceased; Lainer, Vera Nikolaevna, administrator; Lainer, Jury Abramovich, administrator; and Gelfand, Nina Abramovna, administrator, 4,024,087.

Lainer, Jury Abramovich; Tagiev, Eldar Ismail Ogly; Nasyrov, Gakif Zakirovich; Zakharova, Valentina Ivanovna; Lainer, Abram Ilich, deceased; Lainer, Vera Nikolaevna, administrator; Lainer, Jury Abramovich, administrator; and Gelfand, Nina Abramovna, administrator. Method of preparing coagulant for purification of water from mechanical admixtures. 4,024,087, Cl. 252-179.000.

Lainer, Jury Abramovich, administrator: *See—*
Lainer, Jury Abramovich; Tagiev, Eldar Ismail Ogly; Nasyrov, Gakif Zakirovich; Zakharova, Valentina Ivanovna; Lainer, Abram Ilich, deceased; Lainer, Vera Nikolaevna, administrator; Lainer, Jury Abramovich, administrator; and Gelfand, Nina Abramovna, administrator, 4,024,087.

Lainer, Vera Nikolaevna, administrator: *See—*
Lainer, Jury Abramovich; Tagiev, Eldar Ismail Ogly; Nasyrov, Gakif Zakirovich; Zakharova, Valentina Ivanovna; Lainer, Abram Ilich, deceased; Lainer, Vera Nikolaevna, administrator; Lainer, Jury Abramovich, administrator; and Gelfand, Nina Abramovna, administrator, 4,024,087.

Laitram Corporation, The: *See—*
Fowler, John T., 4,024,382.

Lajotte, Dominique: *See—*
Sourgens, Jacques; Lajotte, Dominique; and Michelon, Francois, 4,024,357.

Lake Center Industries: *See—*
Carter, Everett M., 4,024,347.

Lambert, Orand L.: *See—*
Bennett, Howard W.; and Lambert, Orand L., 4,023,676.

Lambert, Thomas W.: *See—*
Bernstein, Stanley; Lambert, Thomas W.; Griswa, Philip J.; and Stagg, Lucius, 4,024,401.

Lampe, Vaino; and Johansson, Karl-Erik, to Uddeholms Aktiebolag. Lining element for pulp refiners. 4,023,739, Cl. 241-296.000.

Landis Lund Limited: *See—*
Smith, Geofrey Ian, 4,023,937.

Landucci, Dennis P., to Minnesota Mining and Manufacturing Company. Fluoroaliphatic radical containing carbodiimides. 4,024,178, Cl. 260-472.000.

Landy, Jerome J. Laminar flow system and removable animal rack. 4,023,529, Cl. 119-15.000.

Lang Davis Industries, Inc.: *See—*
Lang, Thomas J.; Lang, Joseph A.; Lang, Kenneth G.; and Davis, Robert L., 4,023,864.

Lang, Hans-Jochen: *See—*
Druckrey, Eike; Knabe, Bernd; Lang, Hans-Jochen; Babej, Milos; and Muschaweck, Roman, 4,024,274.

Lang, Joseph A.: *See—*
Lang, Thomas J.; Lang, Joseph A.; Lang, Kenneth G.; and Davis, Robert L., 4,023,864.

Lang, Kenneth G.: *See—*
Lang, Thomas J.; Lang, Joseph A.; Lang, Kenneth G.; and Davis, Robert L., 4,023,864.

Lang, Thomas J.; Lang, Joseph A.; Lang, Kenneth G.; and Davis, Robert L., to Lang Davis Industries, Inc. Automatic stability control system with strain gauge sensors. 4,023,864, Cl. 303-20.000.

Langevin, Donald R. Adjustable balance and indicating device. 4,023,631, Cl. 177-46.000.

Lanier Business Products, Inc.: *See—*
Bolick, Fred C., Jr.; Titus, Theodore, IV; and Mohammadioun, Said, 4,024,354.

Larach, Simon, to RCA Corporation. Yttrium tantalate phosphors. 4,024,069, Cl. 252-301.40R.

Larson, Larry Allen, to Caterpillar Tractor Co. Tuned quick connect and disconnect coupling arrangement. 4,023,405, Cl. 73-134.000.

Lassander, Erik: *See—*
Andersson, Conny; and Lassander, Erik, 4,024,337.

Laudon, Monique: *See—*
Bugaut, Andree; and Laudon, Monique, 4,023,926.

Lauer, Richard P.; Rankl, Richard S.; and Dehnke, Theodore H., to Dow Chemical Company, The. Method for removing heat from a chemical reaction. 4,024,329, Cl. 526-61.000.

Lawrence Peska Associates, Inc.: *See—*
Pieters, Eli, 4,023,580.

Layton, Roger M., to G. D. Searle & Co. Bulking agent for foods. 4,024,290, Cl. 426-548.000.

Lazaridis, Lazaros J., to Thermo Electron Corporation. Water heater. 4,023,558, Cl. 126-391.000.

LeBlanc, Lawrence. Rotary sanding and stripping blade. 4,023,313, Cl. 51-209.00R.

Lebow Associates, Inc.: *See—*
Brendel, Albert E., 4,023,404.

Lecolier, Serge L.: *See—*
Biehler, Jean-Marie J.; Lecolier, Serge L.; and Le Roy, Patrice M., 4,024,207.
Lee, Chi-Long; and Ronk, Gary M., to Dow Corning Corporation. Spongeable silicone gum stock. 4,024,091, Cl. 260-2.5QS.
Lee, Lester T. C., to Allied Chemical Corporation. Cycloaliphatic unsymmetrical diamines. 4,024,185, Cl. 260-563.00R.
Lee, Yuan Ho. Feedstock cutting and feeding device for forming machines. 4,023,452, Cl. 83-161.000.
Legatski, Lester K.: *See—*
Brady, Jack D.; and Legatski, Lester K., 4,023,942.
Legendre, Michel: *See—*
Engelhard, Philippe; and Legendre, Michel, 4,024,077.
Legille, Edouard; and Mahr, Rene N., to S.A. des Anciens Etablissements Paul Wurth. Apparatus for the transmission of heated fluid. 4,023,832, Cl. 285-41.000.
Lehan, Frank W.: *See—*
Hartung, Albert F.; Lehan, Frank W.; Barooshian, Charles T.; and Zacharski, Edward J., 4,024,576.
Leider, Philip J.; and Rihs, Jorg, to Westvaco Corporation. Spiral groove pattern refiner plates. 4,023,737, Cl. 241-261.300.
Lemieux, Eugene: *See—*
Mathes, Alva F.; and Lemieux, Eugene, 4,023,670.
Leneveu, Louis J., to Societe Nationale des Poudres et Explosifs. Moldable compositions comprising polyvinyl nitrate. 4,023,996, Cl. 149-19.800.
Lenton, Robert Warren: *See—*
Russell, Donald Henry; and Lenton, Robert Warren, 4,024,104.
Lenz, Arnold; Bleh, Otto; and von Metnitz, Harald, to Dynamit Nobel Aktiengesellschaft. Process for the manufacture of cyclohexene dicarboxylic acid esters. 4,024,173, Cl. 260-468.00K.
Le Parquier, Guy: *See—*
Deman, Pierre; and Le Parquier, Guy, 4,024,350.
L'Eplattenier, Francois; Pugin, Andre; and Vuitel, Laurent, to Ciba-Geigy Corporation. Azomethine pigments. 4,024,132, Cl. 260-240.00G.
Lerch, Ulrich: *See—*
Babej, Milos; Bartmann, Wilhelm; Beck, Gerhard; and Lerch, Ulrich, 4,024,181.
Lerner, George: *See—*
Ellman, Julius; and Lerner, George, 4,023,816.
Lerner, Leonard J.: *See—*
Winters, Giorgio; Odasso, Gianfranco; Galliani, Giulio; and Lerner, Leonard J., 4,024,149.
Lerner, Lewis Brian, to AMP Incorporated. Silver plating. 4,024,031, Cl. 204-46.00R.
Le Roy, Patrice M.: *See—*
Biehler, Jean-Marie J.; Lecolier, Serge L.; and Le Roy, Patrice M., 4,024,207.
Lersmacher, Bernhard; Nerche, Siegfried; and Schelhas, Karlheinz, to U.S. Philips Corporation. Method of manufacturing a porous carbon body. 4,024,226, Cl. 423-449.000.
Les Industries Bfg Limitee: *See—*
Drouin, Clause, 4,023,380.
Lesca, Piercarlo; and Bonzano, Giorgio, to Ing. C. Olivetti & C., S.p.A. Apparatus for writing on, and/or reading, magnetic discs. 4,024,581, Cl. 360-99.000.
Lever Brothers Company: *See—*
Alexander, David John; and Gamadia, Rustom Kooverji, 4,023,710.
Pader, Morton, 4,024,239.
Levin, Daniel R., to J. I. Case Company. Single lever control unit for hydrostatic transmission. 4,023,636, Cl. 180-6.480.
Levinstein, Moses A.; and Bauersfeld, Edward J., to General Electric Company. Clearance control through a nickel-graphite/aluminum copper-base alloy powder mixture. 4,023,252, Cl. 428-650.000.
Levinthal, Michael L.; Allred, Gale F.; and Poulter, Larry W., to Thiokol Corporation. Method of making finely particulate ammonium perchlorate. 4,023,935, Cl. 23-302.00A.
Levy, Hilton B., to United States of America, Health, Education and Welfare. Nuclease-resistant hydrophilic complex of polyriboinosinic-polyribocytidylic acid. 4,024,241, Cl. 424-85.000.
Lewis, Donald E.: *See—*
Reynolds, Charles A.; Mentelos, Richard A.; and Lewis, Donald E., 4,023,563.
Lewis, Jack E. Nunchaku. 4,023,803, Cl. 273-84.000.
Lewis, Mark: *See—*
Clark, Earl C.; and Lewis, William L., 4,023,307.
Lewis, Sheldon N.: *See—*
Mercurio, Andrew; and Lewis, Sheldon N., 4,023,977.
Lewis, William L.: *See—*
Clark, Earl C.; and Lewis, William L., 4,023,307.
Lex, Albert, to Hoesch Werke Aktiengesellschaft. Dynamo or electro band. 4,023,990, Cl. 148-31.550.
Leybold-Heraeus GmbH & Co. KG: *See—*
Bachler, Werner; Frank, Rudiger; Habermann, Helmut; and Brunet, Maurice, 4,023,920.
Redel, Karl-Georg, 4,024,376.
Wilmanns, Ingo, 4,024,291.
Li, Laurie Rhea, to Li, Victor F. C. Urinal device. 4,023,216, Cl. 4-110.000.
Li, Victor F. C.: *See—*
Li, Laurie Rhea, 4,023,216.
Libero Elettrotecnica: *See—*
Fornasari, Paolo, 4,023,708.
Liebert, Karl-Heinz, to Zahnradfabrik Friedrichshafen AG. Auxiliary power steering systems for heavy duty vehicles. 4,023,363, Cl. 60-385.000.
Lien, Neil C., to Baker Manufacturing Company. Cap assembly for multi-size well casings. 4,023,699, Cl. 220-3.800.
Liggett & Myers Incorporated: *See—*
Norman, Vello, 4,023,576.
Sigmon, Ned A., 4,024,012.
Linares, Hubert: *See—*
Blind, Andre; and Linares, Hubert, 4,024,127.
Lincoln Manufacturing Company, Inc.: *See—*
Henke, Mitchell C., 4,024,377.
Lindberg, Frank A.; Konsowski, Stephen G.; Shamash, Maurice B.; and Ponemone, Seymour J., to Westinghouse Electric Corporation. Formation of openings in dielectric sheet. 4,023,999, Cl. 156-652.000.
Lindemann Maschinenfabrik GmbH: *See—*
Schafer, Anton; and Probst, Karl, 4,023,484.
Linder, Ernst: *See—*
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Lindner, Adolf: *See—*
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Lindner, Hans Rudolph: *See—*
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Linkenheimer, Wayne H.: *See—*
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Linthicum, Herbert W.; and Vogeleer, George B., to E.T. Barwick Industries. Screen printing squeegee apparatus. 4,023,486, Cl. 101-120.000.
Lisanti, Vincent F.: *See—*
Eichel, Bertram; and Lisanti, Vincent F., 4,024,237.
Lisnay, Albert D.; and Schilling, Keith L., to Heinemann Electric Company. Circuit breaker. 4,024,482, Cl. 335-169.000.
Littelfuse, Inc.: *See—*
Aryamane, Avinash P., 4,023,265.
Schmidt, John, Jr.; and Aryamane, Avinash, 4,023,264.
Little, John William: *See—*
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Littmann, Wolfgang: *See—*
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Litton Business Systems, Inc.: *See—*
Swett, Robert W.; Goldstein, Amnon; Marshall, Edward C.; and Stanford, Paul E., 4,023,482.
Litton Systems, Inc.: *See—*
Shattuck, Ronald Corroalles, 4,024,368.
Litzenberger, Leonard N.: *See—*
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Liu, Kang-Jen: *See—*
Dege, Gerald J.; and Liu, Kang-Jen, 4,024,043.
Lo, David S.: *See—*
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Lockheed Aircraft Corporation: *See—*
Beasley, T. James, 4,024,383.
Loeding, John W.: *See—*
Schora, Frank C.; Loeding, John W.; and Patel, Jitendra G., 4,023,280.
Loersch, Joseph Frederick; Hurwitz, Peter Alan; and Jordan, Lester Warren, to United Technologies Corporation. Method of hot isostatic compaction. 4,023,966, Cl. 75-226.000.
Login, Robert Bernard, to BASF Wyandotte Corporation. Polyesters containing ionic groups. 4,024,112, Cl. 260-75.00N.
Login, Robert Bernard, to BASF Wyandotte Corporation. Synthetic polymer composition having enhanced antistatic properties. 4,024,205, Cl. 260-857.0PG.
Lohr & Bromkamp GmbH: *See—*
Welschof, Hans-Heinrich, 4,023,382.
Lohr, Raymond J.; Carver, Richard N.; and Ray, James, to Louis Marx & Co., Inc. Spherical projectile game. 4,023,804, Cl. 273-101.000.
London, Charles E.; Tomison, William R.; and Nelson, Roscoe C., III. Combination charcoal lighter and miniature grill. 4,023,553, Cl. 126-25.00B.
Long, William H.: *See—*
Klaenhammer, Bryan L.; and Long, William H., 4,023,888.
Lopez, Lorenzo, Jr. Shaving device. 4,023,269, Cl. 30-41.000.
Lorang, Walter R. Golf training apparatus. 4,023,810, Cl. 273-186.00C.
Lorang, Walter R. Golf swing wrist action training apparatus. 4,023,812, Cl. 273-186.00A.
Loris, Joe. Insulated safetysized equipment. 4,024,316, Cl. 428-409.000.
Lott, William Gray, to Eonair, Inc. Method and product for covering aircraft. 4,024,002, Cl. 156-85.000.
Louis Marx & Co., Inc.: *See—*
Lohr, Raymond J.; Carver, Richard N.; and Ray, James, 4,023,804.
Louver Drape, Inc.: *See—*
Rosenquist, Kurt E., 4,023,609.
Love, Dennis Anthony, to Beecham Group Limited. Amoxicillin derivatives. 4,024,244, Cl. 424-114.000.
Lovell, Robert R.; Berkopec, Frank D.; and Culp, David H., to United States of America, National Aeronautics and Space Administration. Process for preparing liquid metal electrical contact device. 4,023,266, Cl. 29-628.000.

Lovely, John W.; and Hobbs, Robert N., to Bryant Grinder Corporation. Interform grinding machine. 4,023,310, Cl. 51-5.00D.
Lovness, William R.: *See—*
Chase, Curtis L.; and Lovness, William R., 4,024,295.
Lu, Chin H.; and Allen, David A., to Xerox Corporation. Process for developing latent electrostatic images with ink. 4,024,292, Cl. 427-17.000.
Lubov, Donald S., to Georight Industries, Inc. Structural support for a concrete form. 4,023,766, Cl. 249-48.000.
Luc, Jane. Adhesive processes. 4,024,038, Cl. 204-168.000.
Lucas Industries Limited: *See—*
Yarrow, Christopher John; and Johnson, Ronald, 4,024,455.
Ludwig, Bernard J.: *See—*
Reisner, David B.; Ludwig, Bernard J.; Bates, Harold M.; and Berger, Frank M., 4,024,139.
Luhleich, Hartmut; Nickel, Hubertus; Pflaum, Peter; and Dias, Francesco, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Process for producing carbonaceous substances for use in synthetic-graphite and graphite-like bodies. 4,023,979, Cl. 106-284.000.
Lukat, Robert N.: *See—*
Pattillo, William C.; Lukat, Robert N.; and Engel, Neils N., 4,023,736.
Luke, Robert J.; and Robson, Ronald C., to Shell Oil Company. Method and apparatus for detecting temperature variation utilizing the Curie point of a ferromagnetic material. 4,023,412, Cl. 73-362.0CP.
Lukens Steel Company: *See—*
Morse, Stephen Lewis; and McGlynn, James J., 4,023,936.
Lupinski, John H.; and McQuade, James M., to General Electric Company. Method for making polyimide coated conductors in a continuous manner and products made thereby. 4,024,046, Cl. 204-300.0EC.
Lustgarten, David M.: *See—*
Brown, Richard E.; and Lustgarten, David M., 4,024,160.
Lyon, Henry; and Byrne, Stanley William, to American Filtrona Corporation. Smoke filter process and apparatus. 4,024,001, Cl. 156-180.000.
Mac Manufacturing Company: *See—*
Rogers, James H., 4,023,666.
MacAskill, Robert Bruce, Jr., to Scott & Fetzer Company (France Division), The. Burner control system with primary safety switch. 4,024,412, Cl. 307-117.000.
MacDonald, Donald M.; and Deed, Lee H., to International Paper Company. Electroconductive paper coating. 4,024,311, Cl. 428-342.000.
MacKenzie, Robert A.; and Lagsdin, Andry. Stabilizer pad for earth-moving apparatus. 4,023,828, Cl. 280-763.000.
Mader, Helmut: *See—*
Hupp, Gerhard; and Mader, Helmut, 4,023,295.
Mader, Roger A., to Minnesota Mining and Manufacturing Company. 2,4-Dihydroxy-4-pentadecyl benzophenone and compositions containing the same. 4,024,106, Cl. 260-45.95F.
Maegawa, Toshiyuki: *See—*
Tateishi, Iwao; and Maegawa, Toshiyuki, 4,024,384.
Magerkorth, Werner: *See—*
Becker, Wolf-Jurgen; and Magerkorth, Werner, 4,023,709.
Magyar, Joseph J., to General Motors Corporation. Belt retractor with winding prevention and memory mechanism. 4,023,746, Cl. 242-107.700.
Mahler, Darrell G.; and Doumani, Charles, to Blue Cross Laboratories, Inc. Solid stick pan lubricant. 4,023,912, Cl. 401-82.000.
Mahoney, Fred G.: *See—*
Harpman, Webster B.; and Mahoney, Fred G., 4,023,538.
Mahr, Rene N.: *See—*
Legille, Edouard; and Mahr, Rene N., 4,023,832.
Maier, Hans-Peter: *See—*
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Maiese, William M.; and Wax, Richard G., to Merck & Co., Inc. Antibiotic FR-02A and therapeutic compositions thereof. 4,024,251, Cl. 424-181.000.
Maihak AG: *See—*
Blunck, Otto; Seim, Burkhart; Retzow, Karl-Heinz; and Zorner, Karl-Heinz, 4,023,930.
Maitani, Yoshihisa; Hashimoto, Akihiko; and Enomoto, Fujio, to Olympus Optical Co., Ltd. Electrical focal plane shutter with mechanical control mechanism operative upon electromagnetic failure. 4,024,553, Cl. 354-242.000.
Majeske, Harry. Methods of making expansion joints for roads and buildings. 4,023,324, Cl. 52-396.000.
Malinovski, Jordan Petrov: *See—*
Burov, Atanas Tzvetanov; Simidjieva, Penka Atanasova; Stoicheva, Rumyana Toteva; and Malinovski, Jordan Petrov, 4,024,030.
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Malm, Hans R.: *See—*
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Mammino, Joseph: *See—*
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Mangal, Norman F.: *See—*
Hori, Tatsu; Gardiner, Kenneth W.; and Mangal, Norman F., 4,023,791.
Manghi, Carlo Alberto: *See—*
Biraghi, Giorgio; and Manghi, Carlo Alberto, 4,024,360.
Manley, Patricia A. Jewelry box. 4,023,674, Cl. 206-562.000.
Mann, Fred W. Protected feeder and/or insecticide applicator for livestock. 4,023,533, Cl. 119-159.000.
Mann, Richard J.: *See—*
Colbert, Ervin A.; Mann, Richard J.; and Phillips, Robert W., 4,023,374.
Mansei Kogyo Kabushiki Kaisha: *See—*
Goto, Kenjiro, 4,023,922.
Mantey, Paul Gerhard: *See—*
Brotzmann, Karl; Fassbinder, Hans Georg; Mantey, Paul Gerhard; Grapengiesser, Johann Claus; and Hansen, Alfred, 4,023,713.
Marion Laboratories, Inc.: *See—*
Spinner, Ernest Elliott; and Hounsell, Melvin Wayne, 4,023,934.
Marozzi, Alfred A. Rotary imprinting apparatus. 4,023,490, Cl. 101-235.000.
Marquaire, Roger Andre Marie; Curtis, Michel Georges August; and Schappel, Robert Edouard, to Subsea Equipment Associates Limited. Method of connecting of an undersea central station to a group of undersea wells and outflow pipes. 4,023,619, Cl. 166-.600.
Marrero, Louis. Wall switch and outlet frame. 4,023,697, Cl. 220-3.400.
Marshall, Edward C.: *See—*
Swett, Robert W.; Goldstein, Amnon; Marshall, Edward C.; and Stanford, Paul E., 4,023,482.
Marshall, Kenneth Henry, to Premach Pty. Limited. Mount for the worktable of a dental surveyor. 4,023,275, Cl. 32-67.000.
Marsing, Helmut; Parsch, Claus-Peter; and Franksen, Holger, to Siemens Aktiengesellschaft. Shorting contacts for closing a superconducting current path operated by a bellows arrangement responsive to the pressure of a cryogenic medium used in cooling the contacts. 4,024,363, Cl. 200-83.00C.
Martel, Jacques; Buendia, Jean; and Toromanoff, Edmond, to Roussel-UCLAF. Preparation of prostanoic acid derivatives. 4,024,172, Cl. 260-468.00D.
Martin, Lawrence Leo: *See—*
Bauer, Victor John; Martin, Lawrence Leo; and Duffy, Brian John, 4,024,259.
Martin, Peter D. Storage means for ashes from cremations. 4,023,316, Cl. 52-100.000.
Martinec, Eugene F.; and Fairaizl, Max L., to Health-Mor, Inc. Edge cleaning nozzle construction for suction cleaners. 4,023,234, Cl. 15-331.000.
Martinet, Rene G. Electronic clock with capacitative resetting. 4,023,343, Cl. 58-23.00R.
Martini, Thomas: *See—*
Benninger, Siegfried; and Martini, Thomas, 4,024,192.
Martinmaas, Werner W. Body-supporting means with adjustable vibratory means in the audible frequency range. 4,023,566, Cl. 128-33.000.
Maruoka, Hiroyuki: *See—*
Masaki, Kenji; Nakajima, Yasuo; and Maruoka, Hiroyuki, 4,023,359.
Maruzen Oil Co. Ltd.: *See—*
Miyake, Hiroshi; Iriuchijima, Makoto; Takahashi, Eiji; Terata, Kiyoshi; Kamiyama, Hiroki; Kurihara, Masami; Suzuki, Etsuo; and Idai, Tsutomu, 4,024,076.
Marvin H. Kleinberg, Inc.: *See—*
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Marziano, Gian Lorenzo: *See—*
Garberi, Angelo; Geddo, Agostino; Marziano, Gian Lorenzo; and Viviani, Bruno, 4,024,232.
Masaki, Kenji, to Nissan Motor Co., Ltd. System to control the ratio of air to fuel of the mixture delivered to an internal combustion engine. 4,023,357, Cl. 60-276.000.
Masaki, Kenji; Nakajima, Yasuo; and Maruoka, Hiroyuki, to Nissan Motor Co., Ltd. Electronically controlled exhaust gas purifying system. 4,023,359, Cl. 60-277.000.
Maschinenfabrik Loesch GmbH: *See—*
Dammig, Werner, 4,023,723.
Maserang, Robert E.; and Fitzjarrald, Norman L. Fishing line cutter. 4,023,299, Cl. 43-25.000.
Massac, Jean-Louis Gilbert, to Gazocean. Method of making a semi-membrane like container and building a heat insulated fluid tight tank embodying the same. 4,023,726, Cl. 228-184.000.
Master Recessed Systems, Inc.: *See—*
Cohen, Seymour; Klar, Norman; and Schwartz, David, 4,023,235.
Matalonis, Charles V.; and Bott, Edward A., to International Harvester Company. Operator positioning grab handles. 4,023,827, Cl. 280-756.000.
Mathes, Alva F.; and Lemieux, Eugene, to Eastman Kodak Company. Automatic master frame transport apparatus. 4,023,670, Cl. 198-604.000.
Mathis, Edmond J. Elevator rail clamp. 4,023,732, Cl. 238-338.000.
Mato Maschinen- und Metallwarenfabrik Curt Matthaei GmbH & Co. KG: *See—*
Stolz, Hermann, 4,023,239.
Matsuda, Michihiko: *See—*
Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; Kano, Saburo; and Nomura, Osami, 4,024,252.
Matsumoto, Hiroshi: *See—*
Kobayashi, Kesanao; and Matsumoto, Hiroshi, 4,024,085.
Matsumoto, Kunio, to Copal Company Limited. Auto-strobe means for cameras. 4,024,549, Cl. 354-33.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Ikawa, Junzo; Aramaki, Tokuji; and Naitoh, Yasuo, 4,024,542.

Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 4,023,991.
Tokuda, Kazuo; and Minakuchi, Hiroshi, 4,024,445.

Matsushita, Tomiharu: *See—*
Nishihara, Masao; Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Yamasaki, Tatsuo; Noguchi, Masataka; and Nishioka, Kunihiko, 4,023,390.

Matsuura, Yoshiaki. Detecting device for detecting battery outlet voltage. 4,024,415, Cl. 307-362.000.

Matsuzaki, Takehiko: *See—*
Ohta, Nobuto; Imamura, Juichi; and Matsuzaki, Takehiko, 4,024,180.

Matzold, Uwe: *See—*
Bragas, Peter; and Matzold, Uwe, 4,024,475.

Maunu, Olavi. Fish mouth spreader and holder. 4,023,303, Cl. 43-53.500.

Maurer, Helmut; and Keerl, Karl Heinz, to Robert Bosch G.m.b.H. Internal combustion engine reactor protective control system. 4,023,358, Cl. 60-277.000.

Mauser Kommanditgesellschaft: *See—*
Hammes, Theo, 4,023,679.

Mauz, Otto; and Granzer, Ernold, to Hoechst Aktiengesellschaft. Substituted hydroxyphenyl-piperidones. 4,024,267, Cl. 424-267.000.

Mayadas, Ashok Frank: *See—*
Bajorek, Christopher Henry; Hempstead, Robert Douglas; Krongelb, Sol; and Mayadas, Ashok Frank, 4,024,489.

Mayer & Cie: *See—*
Klinger, Dieter, 4,023,383.

Maykut, Albert R.: *See—*
Betts, Robert E.; Thorn, Lawrence B.; and Maykut, Albert R., 4,023,356.

Mayne, William H.; Hawes, William S.; and Badger, Algernon S., to Geosource Inc. Seismic array. 4,024,492, Cl. 340-15.5MC.

MB Associates: *See—*
Dowling, Terence S.; Dompe, Robert J.; Heard, Harry G.; and Hazard, Keith K., 4,024,545.

McAleer, William J.; and Wasmuth, Edward H., to Merck & Co., Inc. Process for isolating hepatitis B antigen. 4,024,243, Cl. 424-89.000.

McAllister, Ronald L.; and Freimuth, John H., to Sperry Rand Corporation. Twine wrapper with spring supplement for round bales. 4,023,479, Cl. 100-5.000.

McArthur, Dennis P., to Union Oil Company of California. Aluminum borate catalyst compositions and use thereof in chemical conversions. 4,024,171, Cl. 260-449.60M.

McCarthy, Bertram Frederick: *See—*
Gurry, George W., 4,024,414.

McClain, James E.; and Scott, Howard L., to Esco Manufacturing Company. Protection of polyphase equipment. 4,024,439, Cl. 361-76.000.

McClure, Charles Laird, to Pro-Tech Inc. Liquid sampling. 4,023,417, Cl. 73-421.00B.

McCorkle, William C., Jr., to United States of America, Army. Directional control system for artillery missiles. 4,023,749, Cl. 244-3.220.

McCoy, Dorothy Joan. Portable, cold grease remover. 4,024,057, Cl. 210-71.000.

McDermott, Noel C., to Kentrox Industries, Inc. Telephone line amplifier. 4,024,346, Cl. 179-1.00A.

McDonald, Allan J., to Thiokol Corporation. Combination diffuser, thermal barrier, and interchamber valve for rockets. 4,023,355, Cl. 60-254.000.

McDonald, William Roy: *See—*
Difley, Charles Rogers; and McDonald, William Roy, 4,023,875.

McDonell, Maurice F.: *See—*
Jong, Howard W.; and McDonell, Maurice F., 4,023,874.

McDonnell Douglas Corporation: *See—*
Jong, Howard W.; and McDonell, Maurice F., 4,023,874.

McGibbon, Graeme, to Xerox Corporation. Electrophotographic liquid development method in which a uniform substantial interface contact is maintained. 4,023,967, Cl. 96-1.0LY.

McGlynn, James J.: *See—*
Morse, Stephen Lewis; and McGlynn, James J., 4,023,936.

McIntosh, Billy L. Apparatus for dead track recovery. 4,024,498, Cl. 340-146.10F.

McIntosh, Harold A., to Robertshaw Controls Company. Electric heating system circuit for sequentially energizing a plurality of heating elements. 4,024,378, Cl. 219-486.000.

McIntosh, Lawrie Gandier: *See—*
Filko, Colin; Smith, Richard Stanley; and McIntosh, Lawrie Gandier, 4,023,720.

McJohnson, Robert B., to Recognition Equipment Incorporated. Modified biphase modulation bar code printer. 4,024,511, Cl. 340-172.500.

McKaveney, James P., to Hooker Chemicals & Plastics Corporation. Battery with silicon metal anodes. 4,024,322, Cl. 429-201.000.

McKay, Donald Roderick; and Parker, Ernest George, to Cominco Ltd. Process for hydrometallurgical upgrading. 4,024,218, Cl. 423-26.000.

McKnight, Virgil L. Paint tray handle and roller support. 4,023,702, Cl. 220-94.00R.

McMillan, Robert M.: *See—*
Sanner, Medford D.; McMillan, Robert M.; and Cave, Ellis K., 4,024,578.

McMillan, William L. Combination bootscraper and nameplate. 4,023,291, Cl. 40-125.00H.

McMills, Corey J.: *See—*
Siden, Dennis C.; and McMills, Corey J., 4,023,272.

McNett, John P.: *See—*
Reiner, Lawrence L.; and McNett, John P., 4,023,705.

McQuade, James M.: *See—*
Lupinski, John H.; and McQuade, James M., 4,024,046.

Mead Corporation, The: *See—*
Calvert, Rodney K.; and Scott, Dale K., 4,023,328.
Smith, Glen C.; and Sanders, Frederick W., 4,024,229.

Mears, William E., to Wilcox Electric, Inc. Amplitude measurement of signals of different frequency. 4,024,459, Cl. 328-139.000.

Medi-Physics, Inc.: *See—*
Winchell, Harry S.; Barak, Morton; and Van Fleet, Parmer, III, 4,024,233.

Medvedev, Alexandr Yakovlevich: *See—*
Bykhovsky, David Grigorievich; and Medvedev, Alexandr Yakovlevich, 4,024,373.

Megles, John E., Jr.; and Richardson, Timothy W., to Corning Glass Works. Apparatus and method for producing composite glass tubing. 4,023,953, Cl. 65-86.000.

Meiser, Werner: *See—*
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, 4,024,270.

Meiss, Barthold, to Continental Gummi-Werke Aktiengesellschaft. Pneumatic vehicle tire. 4,023,608, Cl. 152-362.00R.

Mentelos, Richard A.: *See—*
Reynolds, Charles A.; Mentelos, Richard A.; and Lewis, Donald E., 4,023,563.

Mercer, Michael John; and Crispe, Stanley William, to Simon Vacars Limited. Dough laminators. 4,023,475, Cl. 99-450.100.

Merck & Co., Inc.: *See—*
Maiese, William M.; and Wax, Richard G., 4,024,251.
McAleer, William J.; and Wasmuth, Edward H., 4,024,243.

Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Rogalski, Werner; Kirchlechner, Richard; Seubert, Jurgen; Gottschlich, Rudolf; Steinigeweg, Rosmarie; Bergmann, Rolf; Wahlig, Helmut; and Gante, Joachim, 4,024,272.

Mercurio, Andrew; and Lewis, Sheldon N., to Rohm and Haas Company. Acrylic oligomers as melt flow modifiers of thermoplastic coatings and powders. 4,023,977, Cl. 106-178.000.

Mercurio, Luigi; and Badagnani, Guido, to Ing. C. Olivetti & C., S.p.A. Priority interrupt handling system. 4,024,503, Cl. 340-172.500.

Meric, Jean-Paul; and Peltier, Raymond, to Centre d'Etudes et de Recherches de l'Industrie des Liants Hydrauliques. Device for measuring the dust content of a gas stream. 4,024,407, Cl. 250-574.000.

Merrin, Seymour, to Innotech Corporation. Photovoltaic heterojunction device employing a glassy amorphous material as an active layer. 4,024,558, Cl. 357-2.000.

Messerschmidt, Klaus, to Sebastian Messerschmidt Spezial-maschinenfabrik. Eccentric press. 4,023,393, Cl. 72-337.000.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
Hahn, Hans-Jurgen, 4,024,303.

Messina, Ralph Paul, to Colgate-Palmolive Company. Aerosol spray starch formulation. 4,023,978, Cl. 106-213.000.

Metallgesellschaft Aktiengesellschaft: *See—*
Guth, Hans; Jonas, Gerhard; Kleine-Weischede, Klaus; Wieschen, Hermann; Kaiser, Hans-Joachim; Dorr, Karl-Heinz; and Grimm, Hugo, 4,023,938.
Seidel, Horst; Dahlmann, Horst; Bothe, Rolf; and Schmidt, Hermann, 4,023,960.

Metco, Inc.: *See—*
Thompson, Henry C.; and Tyrrel, William T., 4,024,369.

Metzeler Kautschuk AG: *See—*
Birkle, Hans Gerhard; and Krebitz, Josef, 4,023,438.

Metzler, Jay C., to Schlegel Corporation. Method of making pile weatherstripping. 4,024,004, Cl. 156-169.000.

Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. Compositions and methods employing tetrahydroindolizine derivatives. 4,024,261, Cl. 424-263.000.

Meyer, Jacques: *See—*
Thomas, Philippe; Meyer, Jacques; and d'Avigneau, Jacques Marie, 4,024,111.

Meyer, Jeffry R.; and Billings, John S., Jr., to Westinghouse Electric Corporation. Supporting insulator assembly for gas-insulated equipment. 4,024,339, Cl. 174-21.00C.

Meyerhoefer, Carl E.: *See—*
Forbriger, Arthur W.; and Meyerhoefer, Carl E., 4,023,718.

Meyn, Pieter. Apparatus for cutting out the vent of a fowl. 4,023,237, Cl. 17-11.000.

Mezentsev, Sergei Afanasievich: *See—*
Kats, Arnold Yakovlevich; Dubosarsky, Georgy Pavlovich; Zakhvatkin, Dmitry Pavlovich; Burda, Iosif Kharitonovich; Mezentsev, Sergei Afanasievich; Barshtak, Natan Mironovich; and Chernykh, Jury Vladimirovich, 4,023,594.

Michalet, Charles: *See—*
Laderach, Paul; Michalet, Charles; and Rigaud, Jean, 4,023,339.

Michalowicz, William, to American Color & Chemical Corporation. Preparation of m-amino-α-methylbenzyl alcohol. 4,024,187, Cl. 260-580.000.

Michel, John M.: *See—*
Souza, Anthony J.; and Michel, John M., 4,023,840.

Michel, Karl H.: *See—*
Higgens, Calvin E.; and Michel, Karl H., 4,024,246.
Hoehn, Marvin M.; and Michel, Karl H., 4,024,245.

Michelon, Francois: *See—*
Sourgens, Jacques; Lajotte, Dominique; and Michelon, Francois, 4,024,357.

Micheron, Francois: *See—*
Huignard, Jean-Pierre; and Micheron, Francois, 4,024,513.

Mifal Leyitzur Mamtirim Veavizarei Hashkaya Bekibbutz Dan: *See—*
Zakay, Aba, 4,023,595.

Migneau, Max Jacques, to Souriau et Cie. Connectors. 4,023,881, Cl. 339-89.00R.

Miki, Toshio, to Koyo Seiko Company, Limited. Bearing device. 4,023,868, Cl. 308-207.00A.

Miknaitis, Sigitas, to GTE Automatic Electric Laboratories Incorporated. Method of winding differential coils on a magnetic latching reed switch cross point bobbin. 4,023,262, Cl. 29-605.000.

Miles Laboratories, Inc.: *See—*
Cornelius, Dennis Alfred; and Sternberg, Moshe M., 4,024,286.
Phillips, Robert Dixon, 4,024,120.

Miller, Donald Stuart, to British Hydromechanics Research Association, The. Gas desorption from liquids. 4,023,941, Cl. 55-169.000.

Miller, Francis M., to Conax Corporation. Water activated pressurized gas release device. 4,024,440, Cl. 361-251.000.

Miller, George T., to Hooker Chemicals & Plastics Corporation. Durably flame proofed textile materials. 4,024,308, Cl. 428-290.000.

Miller, John E., to United States Steel Corporation. Piston and piston rod construction for pumps and method of flushing piston-type pumps. 4,023,469, Cl. 92-86.500.

Miller, Robert C.; Wu, Shu-Yau; and Roland, George W., to Westinghouse Electric Corporation. Pyroelectric-field effect electromagnetic radiation detector. 4,024,560, Cl. 357-23.000.

Mills Products, Inc.: *See—*
Katona, Joseph W., 4,023,554.

Minakuchi, Hiroshi: *See—*
Tokuda, Kazuo; and Minakuchi, Hiroshi, 4,024,445.

Minigrip, Inc.: *See—*
Boccia, Salvatore, 4,024,010.

Minks, Floyd M. Electrical latching circuit. 4,024,520, Cl. 340-239.00R.

Minnesota Mining and Manufacturing Company: *See—*
Chase, Curtis L.; and Lovness, William R., 4,024,295.
Klaenhammer, Bryan L.; and Long, William H., 4,023,888.
Landucci, Dennis P., 4,024,178.
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Minolta Camera Kabushiki Kaisha: *See—*
Tsujimoto, Kayoshi, 4,024,551.

Misaki, Nobuo: *See—*
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Mitsubishi Chemical Industries Ltd.: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,024,282.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Anzai, Nobuo; and Kato, Takao, 4,023,655.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Kurata, Masaharu; Tanigaichi, Mineaki; and Ohya, Kazuyuki, 4,024,094.
Yonemitsu, Eiichi; Togo, Shizuo; Hashimoto, Kenichiro; Yui, Tomoyuki; and Sanada, Akihiko, 4,024,195.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Imamura, Yoshiaki, 4,023,430.
Takahashi, Naoyuki; and Murakami, Nobuaki, 4,024,219.

Mitsui, Tatsuro: *See—*
Nakagawa, Ryuichi; Ueda, Takuya; Yoshimatsu, Shiro; Sato, Akira; Mitsui, Tatsuro; Ozaki, Tsuyoshi; and Fukuzawa, Akira, 4,023,962.

Mitsui Toatsu Kagaku Kabushiki Kaisha (Mitsui Toatsu Chemicals, Incorporated): *See—*
Yamaguchi, Tadashi; Ono, Takayuki; Hoshi, Hiroshi; Hirakawa, Michio; and Watanabe, Isao, 4,024,098.

Mitter & Co.: *See—*
Mitter, Mathias, 4,023,487.

Mitter, Mathias, to Mitter & Co. Printing machine with printing ink dispensing arrangement. 4,023,487, Cl. 101-120.000.

Miyagawa, Fumiko, to Rex Industrial Co., Ltd. Apparatus for automatically forming threaded portion having predetermined taper and length for use in automatic threading machine. 4,023,211, Cl. 10-96.00T.

Miyajima, Hajime: *See—*
Ohmori, Yasuo; Sakakura, Mitsuo; and Miyajima, Hajime, 4,024,081.

Miyake, Hiroshi; Iriuchijima, Makoto; Takahashi, Eiji; Terata, Kiyoshi; Kamiyama, Hiroki; Kurihara, Masami; Suzuki, Etsuo; and Idai, Tsutomu, to Maruzen Oil Co. Ltd. Process for producing granular sulfurized material, granular carbon or granular activated carbon. 4,024,076, Cl. 252-422.000.

Miyake, Yoshizo: *See—*
Nakamura, Osamu; Kodama, Teruo; Ogino, Isao; and Miyake, Yoshizo, 4,024,036.

Miyamoto, Toshio. Thread feeder for sewing machine. 4,023,512, Cl. 112-242.000.

Miyata, Satoru: *See—*
Noda, Kanji; Furuya, Kazuki; Miyata, Satoru; and Yoneda, Toyoaki, 4,024,223.

Mizukami, Etsuo: *See—*
Kanatani, Yoshiharu; Ise, Masahiro; and Mizukami, Etsuo, 4,024,389.

Mizuta, Atsuo: *See—*
Fujita, Tatsu; Yamada, Yoshiro; Mizuta, Atsuo; Yamada, Tetsuo; Tsuda, Osamu; Kaneda, Tsugio; Shimazu, Shinichi; and Wada, Yukio, 4,023,392.

Mochizuki, Kasunori: *See—*
Ban, Itsuki; and Mochizuki, Kasunori, 4,024,580.

Mohammadioun, Said: *See—*
Bolick, Fred C., Jr.; Titus, Theodore, IV; and Mohammadioun, Said, 4,024,354.

Moilliet, John Lewis; and Ryan, James Ernest, to Imperial Chemical Industries Limited. Foamed acrylic polymer foam containing ethyl cellulose. 4,024,089, Cl. 260-2.50L.

Molin, Nils Ludvig: *See—*
Enfors, Sven Olof; Molin, Nils Ludvig; Mosbach, Klaus Hermann; and Nilsson, Hans Jorgen, 4,024,042.

Molins Limited: *See—*
Clarke, Peter Alec, 4,023,669.
Preston, Edward George; and Rakowicz, Jan Antoni, 4,023,577.

Molins Machine Company, Inc.: *See—*
Keeny, Thomas R., 4,023,481.

Molis, John. Adjustable bracket to stabilize upright compressed gas containers against displacement on mobile vehicles and ship-board installations and maintenance shops. 4,023,761, Cl. 248-313.000.

Momchilov, Paul G. Method of producing vent holes in tire molds. 4,023,268, Cl. 29-527.600.

Monarch Marking Systems, Inc.: *See—*
Aiple, John R.; Grushon, Harold N.; and Wisecup, David R., 4,023,254.
Bussard, Charles B.; and Wisecup, David R., 4,023,255.
Grushon, Harold N., 4,023,722.
Jenkins, William A., 4,024,005.
Kirby, Raymond L., Jr., 4,023,485.
Kirby, Raymond L., Jr., 4,023,491.

Monks, Reginald; Riley, Anthony Leonard Mark; and Cree, Gavin Murray, to Radiochemical Centre Limited, The. Organ visualization. 4,024,234, Cl. 424-1.000.

Monsanto Company: *See—*
Dobo, Emerick J., 4,023,989.
Ridgway, James S., 4,024,114.
Weiss, Stefan A.; and Johnson, John H., 4,024,020.

Montedison S.p.A.: *See—*
Garberi, Angelo; Geddo, Agostino; Marziano, Gian Lorenzo; and Viviani, Bruno, 4,024,232.

Montefibre, S.p.A.: *See—*
Saino, Emilio; Patritti, Raffaele; and Toscani, Giorgio, 4,023,341.

Moore, James D.: *See—*
Ryan, John W.; and Moore, James D., 4,023,424.

Moore, Robert R. Locking prosthetic knee. 4,023,215, Cl. 3-26.000.

Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, to Black and Decker Manufacturing Company, The. Method of dressing the grinding wheel in a sharpener for twist drills. 4,023,552, Cl. 125-11.0NT.

Moreau, Rene, to Agence Nationale de Valorisation de la Recherche (ANVAR). Degasing of liquid metals, in particular of liquid steel, by vacuum jet. 4,023,783, Cl. 266-208.000.

Morgan, A. Henry; and Seiden, Lewis J., to T-Bar Incorporated. Switch actuator assembly for multiple independently controlled leaf spring contact arrays. 4,024,362, Cl. 200-1.0TK.

Morgan Adhesives Company: *See—*
Eagon, Beverly M.; Carlson, Russell L.; and Fry, Raymond C., 4,023,889.

Morgan, Howard William, Jr., to Filter Specialists, Inc. Filter for liquid material. 4,024,065, Cl. 210-315.000.

Mori, Kazumasa: *See—*
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Mori, Mitsuo: *See—*
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Mori, Tamiki: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, 4,024,280.

Mori, Youzi, to Kabushiki Kaisha World Chemical. Floating-matter removing apparatus. 4,024,063, Cl. 210-242.00R.

Morioka, Minoru: *See—*
Oguma, Yoichi; and Morioka, Minoru, 4,023,853.

Morishita, Toshio: *See—*
Tooka, Takuzo; Araki, Hidejiro; Mori, Mitsuo; Nakane, Katumi; and Morishita, Toshio, 4,023,338.

Morissette, Roger, to Bombardier Limited. Staple cleat for snowmobile track. 4,023,865, Cl. 305-35.0EB.

Morlan, Marcus L. Auxiliary terminal for cartridge fuses. 4,023,884, Cl. 339-258.00F.

Morningstar, Marion G.; and Kehe, Henry J., to B. F. Goodrich Company, The. Internally coated reaction vessel and process for coating the same. 4,024,330, Cl. 526-62.000.

Morokawa, Shigeru: *See—*
Fujita, Hiro; Morokawa, Shigeru; and Tsuzuki, Akira, 4,024,416.

Morris, Elias P.; and Christie, Fred A., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Aft-end ignition system for rocket motor. 4,023,497, Cl. 102-49.700.

Morrison, Clayton A.: *See—*
Pitts, Clyde T.; Ingley, Herbert A.; Farber, Erich A.; and Morrison, Clayton A., 4,023,948.

Morrissey, John Henry: *See*—
Herbst, Noel Martin; and Morrissey, John Henry, 4,024,500.
Morse, Stephen Lewis; and McGlynn, James J., to Lukens Steel Company. Titanium clad steel and process for making. 4,023,936, Cl. 428-679.000.
Morvai, Gabor, to Dominion Lock Company Ltd. Lock cover device. 4,023,388, Cl. 70-455.000.
Mosbach, Klaus Hermann: *See*—
Enfors, Sven Olof; Molin, Nils Ludvig; Mosbach, Klaus Hermann; and Nilsson, Hans Jorgen, 4,024,042.
Mosher, Edward G.; and Webster, John T. Energy means for internal combustion engines. 4,023,545, Cl. 123-119.00E.
Mossman, Ralph Allen, to Tektronix, Inc. Method of providing storage dielectric of phosphor particles coated with secondary emissive material. 4,024,298, Cl. 427-64.000.
Moye, Vergil M., to United States of America, Army. Pneumatic transfer switch for batch weighing. 4,023,632, Cl. 177-70.000.
Mueller, Anthony A.; Bao, Frank W.; Parker, Stephen D.; and Hummeldorf, James L., to Actus, Inc. Sample changer having modular track assembly. 4,024,395, Cl. 250-328.000.
Mueller, Otto H., to General Portland, Inc. Controlled release fertilizer. 4,023,955, Cl. 71-64.00F.
Mueller, Richard J.: *See*—
Pitel, Irving; Silverman, Richard S.; and Mueller, Richard J., 4,023,704.
Muhlfelder, Ludwig: *See*—
Pistiner, Josef Siegfried; Muhlfelder, Ludwig; and Keigler, John Edward, 4,023,752.
Mukaemachi, Takuji; and Hoshi, Tohru, to Hitachi, Ltd. Cross-point switch matrix and multiswitching network using the same. 4,024,352, Cl. 170-18.0GF.
Mukai, Kunio: *See*—
Yoshida, Ryo; Satomi, Takeo; Mukai, Kunio; and Hirano, Masachika, 4,023,956.
Mukaiyama, Fumiaki, to Kabushiki Kaisha Suwa Seikosha. Automatically corrected electronic timepiece. 4,023,344, Cl. 58-35.00W.
Muller, Beat; Peter, Heinrich; Schneider, Peter; and Bickel, Hans, to Ciba-Geigy Corporation. Heteroarylacetamido cephalosporin. 4,024,249, Cl. 260-243.00C.
Muller-Gerbes, Henning: *See*—
Weigand, Hanfried; Bellmann, Bernhard; Muller-Gerbes, Henning; Sack, Wolfhard; and Theimert, Paul-Heinz, 4,023,572.
Muller, Werner Heinrich: *See*—
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Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, to Nippon Shinyaku Co., Ltd. Abietanilides, their production and use. 4,024,280, Cl. 424-324.000.
Murakami, Noboru, to Aisin Seiki Kabushiki Kaisha. Pressure control circuit for use in automatic transmission of vehicle. 4,023,444, Cl. 74-868.000.
Murakami, Nobuaki: *See*—
Takahashi, Naoyuki; and Murakami, Nobuaki, 4,024,219.
Muramatsu, Katsuji: *See*—
Aoyama, Keiichi; Kaneko, Keeji; Muramatsu, Katsuji; and Futagawa, Ikuo, 4,024,557.
Murphy, Jack. Cast positioning device. 4,023,568, Cl. 128-83.000.
Murray, Gregory J.: *See*—
Taylor, Bruce W.; and Murray, Gregory J., 4,023,689.
Murray, Margarethe M. Custom frame assembly. 4,023,293, Cl. 40-152.000.
Muschaweck, Roman: *See*—
Druckrey, Eike; Knabe, Bernd; Lang, Hans-Jochen; Babej, Milos; and Muschaweck, Roman, 4,024,274.
Musher, Daniel M.: *See*—
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Nack, Frank, Jr. Visor. 4,023,854, Cl. 296-97.00C.
Nadelson, Jeffrey, to Sandoz, Inc. Substituted hydroxy pyridones. 4,024,262, Cl. 424-263.000.
Nadelson, Jeffrey, to Sandoz, Inc. Thiodimethylene bis(pivalophenone). 4,024,283, Cl. 424-331.000.
Nador, Julius; and Pearson, David B., to Weston Instruments, Inc. Meter construction. 4,024,472, Cl. 324-151.00R.
Naegeli, Peter, to Givaudan Corporation. Odorant. 4,024,188, Cl. 260-586.00F.
Nagaoka, Isao: *See*—
Imaizumi, Fumitake; Nagaoka, Isao; Kurokawa, Mitsuo; Komatsu, Koei; Takimoto, Yasuyuki; and Kusuda, Hidefumi, 4,023,973.
Nagasaki, Jin: *See*—
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Naitoh, Yasuo: *See*—
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Najmann, Knut: *See*—
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Nakagawa, Ryuichi; Ueda, Takuya; Yoshimatsu, Shiro; Sato, Akira; Mitsui, Tatsuro; Ozaki, Tsuyoshi; and Fukuzawa, Akira, to National Research Institute for Metals. Process for regenerating or producing steel from steel scrap or reduced iron. 4,023,962, Cl. 75-13.000.
Nakajima, Yasuo: *See*—
Masaki, Kenji; Nakajima, Yasuo; and Maruoka, Hiroyuki, 4,023,359.
Nakamura, Osamu; Kodama, Teruo; Ogino, Isao; and Miyake, Yoshizo, to Agency of Industrial Science & Technology. Proton permselective solid-state member and apparatus utilizing said permselective member. 4,024,036, Cl. 204-129.000.
Nakane, Katumi: *See*—
Tooka, Takuzo; Araki, Hidejiro; Mori, Mitsuo; Nakane, Katumi; and Morishita, Toshio, 4,023,338.
Nakayama, Osamu; and Baba, Keizo, to Nippon Electric Company, Ltd. Optical transmission cable terminal and connector apparatus. 4,023,886, Cl. 350-96.00C.
Nalco Chemical Company: *See*—
Finch, Robert E.; and Scala, Robert H., 4,024,216.
Shell, Don C.; and Hayward, Edward C., 4,024,048.
Shell, Don C.; and Hayward, Edward C., 4,024,049.
Shell, Don C.; and Hayward, Edward C., 4,024,050.
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Nanthavong, Souli: *See*—
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Nasyrov, Gakif Zakirovich: *See*—
Lainer, Jury Abramovich; Tagiev, Eldar Ismail Ogly; Nasyrov, Gakif Zakirovich; Zakharova, Valentina Ivanovna; Lainer, Abram Ilich, deceased; Lainer, Vera Nikolaevna, administrator; Lainer, Jury Abramovich, administrator; and Gelfand, Nina Abramovna, administrator, 4,024,087.
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Bishop, Edmund; and Wright, David Timothy, 4,024,037.
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Naumann, Wilhelm; Littmann, Wolfgang; and Aussem, Rudolf, to Klockner-Humboldt-Deutz Aktiengesellschaft. Device for fine honing crankshafts. 4,023,311, Cl. 51-31.000.
NBS, Incorporated (Entire): *See*—
Niece, Melvin L., 4,023,682.
Neef, Gunter: *See*—
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Nelson, Norman A.: *See*—
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Nelson, Roscoe C., III: *See*—
London, Charles E.; Tomison, William R.; and Nelson, Roscoe C., III, 4,023,553.
Nemec, Hans. Electrostimulation method and apparatus. 4,023,574, Cl. 128-420.00A.
Nemetz, Lothar; and Nusse, Klaus, to Eisenwerk Weserhutte AG. Electrical control for hydraulically-actuated, multipath valves. 4,023,586, Cl. 137-82.000.
Nerche, Siegfried: *See*—
Lersmacher, Bernhard; Nerche, Siegfried; and Schelhas, Karlheinz, 4,024,226.
Neumann, Leopold, to Analogic Corporation. Ratiometric analog-to-digital converter. 4,024,533, Cl. 340-347.0NT.
Neuzil, Richard W.; and Priegnitz, James W., to UOP Inc. Process for separating a ketose from an aldose by selective adsorption. 4,024,331, Cl. 536-1.000.
Newman, Dwight Clark. Seed planting roller device. 4,023,511, Cl. 111-89.000.
Newns, George Reginald; and Beales, Keith John, to Post Office, The. Making a dielectric optical waveguide glass. 4,023,952, Cl. 65-32.000.
Newton, William Chesterfield. Golf practising device. 4,023,809, Cl. 273-184.00B.
Nicholson, Myron Donald, to Union Carbide Corporation. Homogeneous hydroxy-alkylation of cellulose. 4,024,335, Cl. 536-95.000.
Nickel, Hubertus: *See*—
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Niece, Melvin L., to NBS, Incorporated (Entire). Device for securing containers to refrigerator shelves. 4,023,682, Cl. 211-184.000.
Niederhauser, Marc; and Huguenot, Pierre, to Bolex International SA. Electronic photometer with two variable indicators. 4,023,910, Cl. 356-227.000.
Nienhaus, Clemens: *See*—
Geisthoff, Hubert; and Nienhaus, Clemens, 4,023,822.
Nies, Konrad: *See*—
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Nieson, Norman, to Teleglobe Pay TV System Inc. Validation method and apparatus for pay television systems. 4,024,574, Cl. 358-117.000.
Nifco Inc.: *See*—
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Nihon Kaiheiki Industrial Company, Ltd.: *See*—
Kodaira, Yasuo; and Misaki, Nobuo, 4,024,367.
Nilsen, Arnold Earl, to NL Industries, Inc. Method for recovering vanadium from magnetite and forming a magnetite product low in sodium and silica. 4,023,959, Cl. 75-1.00R.

Nilsson, Hans Jorgen: *See—*
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Nipki po Tzvetna Metalurgia: *See—*
Enchev, Ivan Dimitrov; Ilel, Eliesser Persiado; Kunchev, Nikola Tzanov; Harizanov, Kiril Georgiev; Genevski, Vladimir Vetov; Draganov, Nedelcho Draganov; Haralampiev, Georgi Alexandrov; Smilenov, Todor Ivanov; Stoyanov, Yossif Genchev; and Alexandrov, Alexander Minchev, 4,024,035.
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Nippon Hoso Kyokai: *See—*
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Nippon Shinyaku Co., Ltd.: *See—*
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Nippon Steel Corporation: *See—*
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Nippon Toki Kabushiki Kaisha: *See—*
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Nishihara, Masao; Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Yamasaki, Tatsuo; Noguchi, Masataka; and Nishioka, Kunihiko, to Kobe Steel Ltd. Machine for use in hydrostatic extrusion. 4,023,390, Cl. 72-60.000.
Nishino, Hisao; and Ohta, Kouichirou, to Tohoku Metal Industries Limited. Stabilized DC power supply device. 4,024,451, Cl. 321-2.000.
Nishioka, Kunihiko: *See—*
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Noguchi, Masaaki; Bunda, Tsuchio; Sumiyoshi, Masaharu; and Kondo, Yasuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel-reforming device for internal combustion engines. 4,023,539, Cl. 123-3.000.
Noguchi, Masataka: *See—*
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Nomura, Giichiro; Ando, Takuo; Ariga, Keiji; Ikeda, Akira; Saijo, Kinji; and Sato, Taizo, to Toyo Kohan Co., Ltd. Method of producing soft thin steel sheet by continuous annealing. 4,023,987, Cl. 148-12.00D.
Nomura, Osami: *See—*
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North American Philips Corporation: *See—*
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Northrop Corporation: *See—*
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November, Milton H., to International Telephone and Telegraph Corporation. Viscosimeter and/or densitometer. 4,023,400, Cl. 73-54.000.
Novikov, Oleg Nikolaevich: *See—*
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Oak Industries Inc.: *See—*
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Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, to Kabushiki Kaisha Dawai Gakki Seisakusho. Tone source apparatus for an electronic musical instrument. 4,023,454, Cl. 84-1.010.
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O'Brien, Frank J. Remote temperature change warning system. 4,024,495, Cl. 340-57.000.
O'Brien, John F.; and Hauser, Oscar G., to Xerox Corporation. Electrostatographic apparatus. 4,023,895, Cl. 355-3.00R.
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Ogihara, Susumu; and Tezuka, Yoshitomo, to Aida Engineering, Ltd. Apparatus for producing fine iron particles. 4,023,738, Cl. 241-271.000.
Ogino, Isao: *See—*
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Oguma, Yoichi; and Morioka, Minoru, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle fairing. 4,023,853, Cl. 296-78.100.
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Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, 4,024,280.
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Ohmori, Yasuo; Sakakura, Mitsuo; and Miyajima, Hajime, to Toko Incorporated. Ferroelectric ceramic compositions. 4,024,081, Cl. 252-62.900.
Ohno, Genji; and Inoue, Eiichi, to Research and Development Laboratories of Ohno Co., Ltd. Electrostatic developing apparatus. 4,023,898, Cl. 355-10.000.
Ohsawa, Mitsuo, to Sony Corporation. FM discriminator. 4,024,461, Cl. 329-138.000.
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Olander, Karl Erik, to Alfa-Laval AB. Control device for milking machines. 4,023,588, Cl. 137-103.000.

Olesen, Kaj Sigard; and Bodtcher-Hansen, Henrik, to H. Bodtcher-Hansen A/S. Electric curling iron. 4,024,375, Cl. 219-225.000.

Olin Corporation: *See—*
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Olita, Stephen Gregory. Sensalight. 4,024,413, Cl. 307-117.000.

Oloman, Colin W.: *See—*
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Ono Pharmaceutical Company: *See—*
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Onodera, Hirohumi. Food refrigerating method. 4,023,376, Cl. 62-63.000.

Onodera, Hirohumi. Food refrigerating apparatus. 4,023,381, Cl. 62-381.000.

Optical Associates, Incorporated: *See—*
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Oregon Drop Corporation, The: *See—*
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Orlitzky, Anton; Oloman, Colin W.; and Fandrich, Helmut E. Lubricant applicators. 4,023,648, Cl. 184-39.000.

Ormsby, George S., to Picenco International, Inc. Gauge means for fluid handling apparatus. 4,023,416, Cl. 73-419.000.

Ortlieb, Alfred: *See—*
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Osterwalder, Jean-Pierre F. Speed reducing device. 4,023,441, Cl. 74-805.000.

Ostroff, Norman; and Takvoryan, Nurhan E., to UOP Inc. Flue gas scrubbing and conversion of calcium sulfite to calcium sulfate. 4,024,220, Cl. 423-242.000.

Otis Engineering Corporation: *See—*
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Oto-Data, Inc.: *See—*
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Ouvrard, Paul, to Societe Anonyme Dite: Antar Petroles de l'Atlantique. Method and apparatus for the continuous automatic analysis of the filterability point of liquids, particularly doped diesel oil. 4,023,397, Cl. 73-17.00R.

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Palka, James J.; and Rutkovsky, Michael V., to General Bathroom Products Corporation. Cabinet. 4,023,872, Cl. 312-226.000.

Palm, J. Daniel. Use of dietary fructose in the control of human stress response. 4,024,250, Cl. 424-180.000.

Palmer, Harold Dwaine: *See—*
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Palmer, Richard D.; Barr, Jack R.; and Hrodey, Thomas E., to Caterpillar Tractor Co. Modular operator's compartment for tractors. 4,023,851, Cl. 296-28.00C.

Palmieri, Chester A.: *See—*
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Pantridge, James Francis; and Anderson, John. Defibrillator. 4,023,573, Cl. 128-419.00D.

Pappas, John A.: *See—*
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Papsco, William G.; Cohn, Harry, Jr.; and Bean, Rufus C., to Papsco, Inc. Dolly for maneuvering modules of a modular wall system. 4,023,686, Cl. 214-1.00H.

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Parsch, Claus-Peter: *See—*
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Partyka, Richard Anthony; Gordon, Maxwell; Kametani, Tetsuji; and Kigasawa, Kazuo, to Bristol-Myers Company, by said Richard Anthony Partyka and Maxwell Gordon. Analgesics. 4,024,082, Cl. 260-250.00C.

Patax Trust Reg.: *See—*
Buhler, Hugo, 4,024,003.

Patel, Jitendra G.: *See—*
Schora, Frank C.; Loeding, John W.; and Patel, Jitendra G., 4,023,280.

Patelli, Bianca: *See—*
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and di Marco, Aurelio, 4,024,224.

Patritti, Raffaele: *See—*
Saino, Emilio; Patritti, Raffaele; and Toscani, Giorgio, 4,023,341.

Patterson, William R., to General Electric Company. Thermal actuated valve for clearance control. 4,023,731, Cl. 236-93.00R.

Patterson, William R., to General Electric Company. Thermal actuated valve for clearance control. 4,023,919, Cl. 415-134.000.

Pattillo, William C.; Lukat, Robert N.; and Engel, Neils N., to Southern Saw Service, Inc. Chopper plate. 4,023,736, Cl. 241-82.500.

Pattyn, Herman Alberik: *See—*
Vanassche, Willy Joseph; and Pattyn, Herman Alberik, 4,023,972.

Patzke, Robert C.; DeRyke, Thomas V.; Ernohazy, Stephen; and Oddo, Eugene P., to Addressograph Multigraph Corporation. Pump and metering device. 4,023,592, Cl. 137-565.000.

Pauley, Reginald William: *See—*
Clapp, John Madison; and Pauley, Reginald William, 4,023,627.

Pauls, Edward A. Cross-country ski exerciser. 4,023,795, Cl. 272-97.000.

Paverman, Grisha H. Load bearing reinforced ground slab. 4,023,325, Cl. 52-742.000.

Pavlas, Garnet L., to Bettis Corporation. Spring loaded split nut. 4,023,431, Cl. 74-424.80A.

Payne, George Bernson: *See—*
Soloway, Samuel B.; and Payne, George Bernson, 4,024,161.

Payne, Howard H.: *See—*
Vetter, Ronald F.; Diebold, James P.; Sieg, George F.; Gerrish, Howard W., Jr.; Payne, Howard H.; Rhyn, Elmer J.; and Witcosky, Irvin F., 4,023,354.

Payne, Peter R. Aeolian windmill. 4,024,409, Cl. 290-55.000.

PCR, Inc.: *See—*
Schuman, Paul D.; and Anderson, Roy, 4,024,143.

Pearson, David B.: *See—*
Nador, Julius; and Pearson, David B., 4,024,472.

Pearson, Robert Charles, to International Business Machines Corporation. Function multiplexer. 4,024,510, Cl. 340-172.500.

Pellerin, William Dodd; Higgins, Peter Webb; and Parnell, Joseph Henery, III, to Tideland Signal Corporation. Wireless marine navigational aid system. 4,024,491, Cl. 340-5.00R.

Pelley, Arlo D., to Rockwell International Corporation. A.C. amplifier automatic gain control fast attack circuit. 4,024,463, Cl. 330-138.000.

Peltier, Raymond: *See—*
Meric, Jean-Paul; and Peltier, Raymond, 4,024,407.

Peltzer, Bernd: *See—*
Kuhn, Peter; Raichle, Karl; Kuchenmeister, Rolf; and Peltzer, Bernd, 4,024,100.

Pender, David R., to Wilder, Ronald P. Foam glass structural element and method of producing. 4,024,309, Cl. 428-312.000.

Penn-Erie Manufacturing Company: *See—*
Sedziak, Anthony Z., 4,023,770.

Penobscot Shoe Company: *See—*
Pfander, Wilhelm, 4,023,283.

Penzias, Arno Allan: *See—*
Carlson, Eric Robert; Penzias, Arno Allan; and Schneider, Martin Victor, 4,023,258.

Pepsico, Inc.: *See—*
Rovani, William, 4,023,213.

Perel, Richard, to United States Fused Quartz Company, Inc. Method of transferring semi-conductor discs by a hinged transfer carrier. 4,023,691, Cl. 214-152.000.

Perhed, Per-Gunnar Arthur, to AB Volvo. Remote-controlled, motor-driven transport car for transporting motors during assembly. 4,023,639, Cl. 180-21.000.

Perkin, Gregg S.; Robinson, Glen; and Thometz, Theodore G., to Smith International, Inc. Well jar having a time delay section. 4,023,630, Cl. 175-297.000.

Perkins, William, to Reid Dominion Packaging Ltd. Display package. 4,023,759, Cl. 248-174.000.

Perronin, Jean; and Gurtner, Bernard Jean Robert, to Produits Chimiques Ugine Kuhlmann. Process for the preparation of pigmentary metallic particles coated with an organic polymer and compositions resulting therefrom. 4,023,981, Cl. 106-308.00Q.

Perrot, Friedrich: *See—*
Giger, Urs; and Perrot, Friedrich, 4,023,348.

Personal Products Company: *See—*
Chinai, Kays; and Ginocchio, James A., 4,023,570.
Comerford, John M.; and Hammad, Mohamed W., 4,023,571.

Perstorp AB: *See—*
Cederberg, Kjell A.; Konicek, Jiri K.; and Malm, Hans R., 4,023,998.

Perucca, Vincenzo, to Ing. C. Olivetti & C., S.p.A. Arrangement for adjusting the spacing between a print head and a platen. 4,023,662, Cl. 197-1.00R.

Peter, Heinrich: *See—*
Muller, Beat; Peter, Heinrich; Schneider, Peter; and Bickel, Hans, 4,024,249.

Peter, Josef: *See—*
Krasser, Fritz; Peter, Josef; and Volkl, Rainer, 4,024,487.

Petera, Theodor: *See—*
Herb, Eugen; and Petera, Theodor, 4,023,788.

Peterson, Marvin L., to Du Pont de Nemours, E. I., and Company. Process for the production of liquid acetals. 4,024,159, Cl. 260-340.700.

Peterson, Richard H. Circuit for imitating the speech characteristics of reed organ pipes. 4,023,455, Cl. 84-1.210.

Petrikov, Viktor Grigorievich: *See—*
Tochilkin, Anatoly Andreevich; Pshirkov, Vladilen Filippovich; Vigdorchik, Semen Abramovich; Vorobiev, Igor Andreevich; Petrikov, Viktor Grigorievich; and Kastosov, Alexandr Andreevich, 4,023,225.

Petta, John M.: *See—*
Brenner, L. Martin; Petta, John M.; and Ross, Stephen T., 4,024,273.

Pettersson, Borge Hugo. Electrical connector device securable to metal member. 4,023,882, Cl. 339-96.000.

Pez, Guido P., to Allied Chemical Corporation. Titanium complexes with nitrogen. 4,024,169, Cl. 260-429.500.

Pfander, Wilhelm, to Penobscot Shoe Company. Moccasin-type shoe seam and method of manufacturing same. 4,023,283, Cl. 36-11.000.

Pfizer Inc.: *See—*
Bindra, Jasjit S.; and Johnson, Michael R., 4,024,179.
Fenner, Brian Richard; Hardstone, John David; and Graves Leeming, Michael Ramond, 4,024,332.
Stam, John G., 4,024,130.

Pflaum, Peter: *See—*
Luhleich, Hartmut; Nickel, Hubertus; Pflaum, Peter; and Dias, Francesco, 4,023,979.

Pfost, R. Fred; and Breeze, Eric G., to Service Distributors, Inc. Binary system for magnetic card actuation for laundry machines. 4,024,379, Cl. 235-61.70B.

Phalangas, Charalambos J.; Restaino, Alfred J.; and Yun, Han Bo, to Hercules Incorporated. Polymerization of unsaturated monomers with radiation in the presence of salts. 4,024,040, Cl. 204-159.220.

Phares, Michael W., to Rheem Manufacturing Company. Stuffing machine with telescoping nozzle. 4,023,238, Cl. 17-41.000.

Phillips Petroleum Company: *See—*
Campbell, Robert W.; and Yelton, Harold D., 4,024,118.
Haskell, Donald M., 4,024,028.
Hutchinson, William Milton, deceased, 4,024,086.
Scoggin, Jack S., 4,024,191.

Phillips, Robert Dixon, to Miles Laboratories, Inc. Process for producing bland, protein enriched products from grain gluten. 4,024,120, Cl. 260-112.00G.

Phillips, Robert W.: *See—*
Colbert, Ervin A.; Mann, Richard J.; and Phillips, Robert W., 4,023,374.

Piccardo, Jack E., to Rucker Company, The. Valve and control therefor. 4,023,593, Cl. 137-625.640.

Picenco International, Inc.: *See—*
Ormsby, George S., 4,023,416.

Picker Corporation: *See—*
Hatch, Kenneth F., 4,024,398.

Pickering, Dennis R.: *See—*
Gregornik, Norman W.; and Pickering, Dennis R., 4,024,008.

Pidebois, Jacques Eloi: *See—*
Beyler, Roland Robert Charles; Caruel, Jacques Emile Jules; Pidebois, Jacques Eloi; Quillevere, Herve Alain; and Schenher, Michel Bernard, 4,023,351.

Pierce, Paul, Jr., to B. H. Bunn Company. Twine catcher and knife trap assembly for package tying machine. 4,023,837, Cl. 289-13.000.

Pieters, Eli, to Lawrence Peska Associates, Inc., a part interest. Plaque marker toothbrush kit. 4,023,580, Cl. 132-84.00A.

Pietsch, Erich, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Device for the side-registering of sheets. 4,023,793, Cl. 271-252.000.

Piette, Leonard A., to Unipas, Inc. Method of making an encapsulated wet motor circulator. 4,023,261, Cl. 29-598.000.

Pigerol, Charles; Chandavoine, Marie-Madeleine; de Fillain, Paul de Cointet; and Nanthavong, Souli, to Labaz. 2-(3'-Methoxy-4'-hydroxy-phenol)-indole. 4,024,155, Cl. 260-326.160.

Pignataro, Dominic Francis, to Walker Magnetics Group, Inc. Method of fabricating a magnetic chuck. 4,023,267, Cl. 29-416.000.

Piller, Rudolf, to Kugelfischer Georg Schafer & Co. Roller bearing for backup rollers in multi-roll mills. 4,023,867, Cl. 308-207.00R.

Pillsbury Company, The: *See—*
Burgess, Ralph D., Jr., 4,023,476.

Pioneer Electronic Corporation: *See—*
Simizu, Terumasa, 4,024,348.
Takahashi, Gaiko, 4,024,355.

Pistiner, Josef Siegfried; Muhlfelder, Ludwig; and Keigler, John Edward, to RCA Corporation. Elimination of residual spacecraft nutation due to propulsive torques. 4,023,752, Cl. 244-169.000.

Pitel, Irving; Silverman, Richard S.; and Mueller, Richard J., to Rowe International Inc. Helical feed merchandising machine. 4,023,704, Cl. 221-75.000.

Pittet, Alan O.: *See—*
Hruza nee Sanderson, Anne; Schreiber, William L.; van Praag, Michel; Pittet, Alan O.; and Evers, William J., 4,024,190.

Pitts, Charles A., to Dow Chemical Company, The. Tree saver packer cup. 4,023,814, Cl. 277-181.000.

Pitts, Clyde T.; Ingley, Herbert A.; Farber, Erich A.; and Morrison, Clayton A. Solar energy refrigeration and air conditioning system. 4,023,948, Cl. 62-191.000.

Plant, David N. Knock-down wine bottle rack. 4,023,681, Cl. 211-74.000.

Plate, John R.: *See—*
Heisig, Charles P.; and Plate, John R., 4,023,646.

Platt, Karl-Ludwig: *See—*
Diefenbach, Horst; and Platt, Karl-Ludwig, 4,024,327.

Pleier, Walter J., to Eaton Corporation. Hydraulic systems for two speed lifting. 4,023,650, Cl. 187-9.00R.

Plempel, Manfred: *See—*
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, 4,024,270.

Plessey Incorporated: *See—*
Douglas, Peter; and Stewart, Thomas Ian, 4,023,961.

Plunkett, Philip Charles: *See—*
Dolby, Ray Milton; and Plunkett, Philip Charles, 4,024,344.

Plurichemie Anstalt: *See—*
Villax, Joao Emerico, 4,024,131.

Poehlmann, Paul W., to H. Koch & Sons, Inc. Broken-bolt release mechanism. 4,023,846, Cl. 294-83.0AE.

Poirier, Victor L., to Thermo Electron Corporation. Blood pump stroke volume limiter. 4,023,468, Cl. 92-13.200.

Pollard, Bernard Robert, to Jones & Laughlin Steel Corporation. Gas shroud. 4,023,614, Cl. 164-259.000.

Ponemone, Seymour J.: *See—*
Lindberg, Frank A.; Konsowski, Stephen G.; Shamash, Maurice B.; and Ponemone, Seymour J., 4,023,999.

Porret, Daniel: *See—*
Habermeier, Juergen; and Porret, Daniel, 4,024,146.

Post Office, The: *See—*
Newns, George Reginald; and Beales, Keith John, 4,023,952.

Post, Udo: *See—*
von Bonin, Wulf; Kleimann, Helmut; and Post, Udo, 4,024,090.

Postma, Willem Johannes, to U.S. Philips Corporation. Method of making an adjusting pin for a ferro-magnetic core. 4,023,263, Cl. 29-607.000.

Poulter, Larry W.: *See—*
Levinthal, Michael L.; Allred, Gale F.; and Poulter, Larry W., 4,023,935.

Powell, Lloyd J., to International Telephone and Telegraph Corporation. Contact retention assembly. 4,023,880, Cl. 339-59.00R.

Power Transfer Corporation: *See—*
Schutz, Ewald, 4,023,433.

Powers, Billy G.: *See—*
Smith, Robert L., 4,023,321.

PPG Industries, Inc.: *See—*
Ammons, Vernon G., 4,024,113.
Gruber, Gerald W., 4,024,296.
Gruber, Gerald W., 4,024,297.
Jensen, Thomas H., 4,024,336.
Prain, Hunter Douglas: *See—*
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,024,260.
Prasch, Johann, to Klockner-Humboldt-Deutz Aktiengesellschaft. Lubricating device for internal combustion engines. 4,023,548, Cl. 123-196.0CP.
Precision Mechanical Developments Ltd.: *See—*
Kennington, Frank William; and Dimitracopoulos, Panayotis Constantine, 4,023,440.
Preh Elektrofeinmechanische Werke, Jakob Preh Nachf.: *See—*
Eberwein, Helmut; Vogt, Alfred; and Greb, Paul, 4,024,502.
Premach Pty. Limited: *See—*
Marshall, Kenneth Henry, 4,023,275.
Presler, Donald P.; and Didow, Donald G., to Oberjuerge Rubber Company. Means to seal-off portions of underground mines and the like. 4,023,372, Cl. 61-45.00R.
Preston, Edward George; and Rakowicz, Jan Antoni, to Molins Limited. Manufacture of cigarettes. 4,023,577, Cl. 131-94.000.
Prestwich, John Richard, to Warwick Pump and Engineering Company Limited. Surface cleaning device. 4,023,233, Cl. 15-320.000.
Preuss, Robert K.: *See—*
Dore, James E.; Yarwood, John C.; and Preuss, Robert K., 4,024,212.
Yarwood, John C.; Dore, James E.; and Preuss, Robert K., 4,024,056.
Price, Charles E.: *See—*
Kipple, Harry P.; Alke, Roger J.; Coppage, John R.; Price, Charles E.; and Sturman, Brian J., Jr., 4,023,943.
Priefert Mfg. Co., Inc.: *See—*
Priefert, William D., 4,023,693.
Priefert, William D., to Priefert Mfg. Co., Inc. Apparatus for handling a large hay bale. 4,023,693, Cl. 214-354.000.
Priegnitz, James W.: *See—*
Neuzil, Richard W.; and Priegnitz, James W., 4,024,331.
Priegnitz, Robert A., to Coilcraft, Inc. Delta phase loss detector. 4,024,438, Cl. 361-92.000.
Prillieux, Marcel; Robert, Marcel; and Tirtiaux, Robert, to Exxon Research and Engineering Company. Blends of hydrogenated oligomers of cyclopentadienes and paraffinic oils. 4,023,980, Cl. 106-285.000.
Prine, David W.: *See—*
Clark, Robert N.; Prine, David W.; and Chin, Fay K., 4,024,522.
Pro-Tech Inc.: *See—*
McClure, Charles Laird, 4,023,417.
Probst, Karl: *See—*
Schafer, Anton; and Probst, Karl, 4,023,484.
Prochazka, Svanite, to General Electric Company. Hot pressed silicon carbide containing beryllium carbide. 4,023,975, Cl. 106-44.000.
Prochnow, Juergen: *See—*
Fischer, Siegmar; Silligmann, Karl-Heinz; and Prochnow, Juergen, 4,023,495.
Procter & Gamble Company, The: *See—*
Gilbert, Lawrence A.; and Schuette, John W., 4,024,078.
Production Engineering Research Association, The: *See—*
Healiss, Kenneth, 4,023,651.
Production Measurements Corporation: *See—*
Bobulski, Henry Alan, 4,024,469.
Produits Chimiques Ugine Kuhlmann: *See—*
Perronin, Jean; and Gurtner, Bernard Jean Robert, 4,023,981.
Progressive Equipment Corporation: *See—*
Clark, David C.; Silverman, Louis H.; and Barnard, John K., 4,024,047.
Pronin, Alexander. Tennis serve training device. 4,023,798, Cl. 273-29.00A.
Provi, Mike A.; and Guinter, S. Robert, to Brearley Company, The. Platform type weighing scale. 4,023,634, Cl. 177-211.000.
Province, Gary L.: *See—*
Thorne, John K.; Province, Gary L.; and Siltanen, Clyde W., 4,023,557.
Prvni Brnenska strojirna: *See—*
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Pshirkov, Vladilen Filippovich: *See—*
Tochilkin, Anatoly Andreevich; Pshirkov, Vladilen Filippovich; Vigdorchik, Semen Abramovich; Vorobiev, Igor Andreevich; Petrikov, Viktor Grigorievich; and Kastosov, Alexandr Andreevich, 4,023,225.
Pugin, Andre: *See—*
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Pulley, Harvey E. Holder for recipe cards and the like. 4,023,763, Cl. 248-452.000.
Pulman, David Allen: *See—*
Elliott, Michael; Janes, Norman Frank; and Pulman, David Allen, 4,024,163.
Punnett, Frazer D.; Schmidt, Charles H., Jr.; and Tates, Donald W., to Xerox Corporation. Sheet feeding apparatus. 4,023,792, Cl. 271-22.000.
Purdue Research Foundation: *See—*
Robey, Melvin J., 4,023,506.
Pye Limited: *See—*
Gatiss, John William, 4,024,061.
Quesnel, F. Joseph. Refrigerator door lock with alarm. 4,024,494, Cl. 340-52.00R.
Quillevere, Herve Alain: *See—*
Beyler, Roland Robert Charles; Caruel, Jacques Emile Jules; Pidebois, Jacques Eloi; Quillevere, Herve Alain; and Schenher, Michel Bernard, 4,023,351.
Quinlivan, Richard P.; and Westerholt, Harry H., to General Electric Company. Method and apparatus for flight path control. 4,024,539, Cl. 343-11.00R
Raahauge, Jerald Carl, to Kingmann-White, Inc. Instrument recording pen. 4,024,547, Cl. 346-140.00A.
Rabenhorst, David W., to Johns Hopkins University, The. Filament rotor having elastic sheaths covering the filamentary elements of the structure. 4,023,437, Cl. 74-572.000.
Rack Engineering Company: *See—*
Saul, David M., 4,023,684.
Radiochemical Centre Limited, The: *See—*
Monks, Reginald; Riley, Anthony Leonard Mark; and Cree, Gavin Murray, 4,024,234.
Rahme, Selim R.: *See—*
Grumblatt, James E., 4,023,395.
Raichle, Karl: *See—*
Kuhn, Peter; Raichle, Karl; Kuchenmeister, Rolf; and Peltzer, Bernd, 4,024,100.
Rain, Norman; and Sullivan, Arthur Basil Joseph, to National Research Development Corporation. Electrodeposition. 4,024,029, Cl. 204-15.000.
Rairden, John R., III, to General Electric Company. Protective coatings for superalloys. 4,024,294, Cl. 427-42.000.
Rakowicz, Jan Antoni: *See—*
Preston, Edward George; and Rakowicz, Jan Antoni, 4,023,577.
Rakowicz, Maurice R.; and Rodrigues, John J., to Kordon Corporation. Liquid treating system and included filter assembly. 4,024,064, Cl. 210-258.000.
Ramm, Peter John: *See—*
Barnes, Alan Charles; Hairsine, Peter Wilfred; Ramm, Peter John; and Taylor, John Bodenham, 4,024,276.
Randle, Edwin W.: *See—*
Garcia, George E., 4,023,415.
Randle, Thelma H.: *See—*
Garcia, George E., 4,023,415.
Randmae, Rein, to Vicon Industries, Inc. Attenuation spot filters and manufacturing process. 4,023,522, Cl. 118-47.000.
Rankin, William Wirt: *See—*
Ashmus, Donald Harold; Rankin, William Wirt; and Walter, Andrew Tainter, 4,023,526.
Rankl, Richard S.: *See—*
Lauer, Richard P.; Rankl, Richard S.; and Dehnke, Theodore H., 4,024,329.
Ranz, Erwin: *See—*
Hellmig, Ehrhard; and Ranz, Erwin, 4,023,970.
Raposa, Henry James; and Tennant, Robert John, to AMP Incorporated. Tap connector for use with stranded wire. 4,023,883, Cl. 339-98.000.
Ratelband, Johannes Bernadus. Sleeve valve comprising a core provided with longitudinal ribs. 4,023,772, Cl. 251-5.000.
Rattiner, David H.: *See—*
Albanese, Angelo P.; Palmieri, Chester A.; and Rattiner, David H., 4,024,541.
Raudys, Vytas Andrew: *See—*
Kupcikevicius, Vytautas; and Raudys, Vytas Andrew, 4,023,329.
Raulerson, James D.: *See—*
Cade, J. Robert; and Raulerson, James D., 4,023,560.
Rausch, Richard E., to UOP Inc. Hydrocarbon isomerization process. 4,024,199, Cl. 260-668.00A.
Ray, James: *See—*
Lohr, Raymond J.; Carver, Richard N.; and Ray, James, 4,023,804.
Raychem Corporation: *See—*
Dahl, Klaus J., 4,024,314.
Siden, Dennis C.; and McMills, Corey J., 4,023,272.
Raymond, Joseph H., Jr.: *See—*
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Raymond Lee Organization, Inc., The: *See—*
Korn, Bernard, 4,023,642.
Raytheon Company: *See—*
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RCA Corporation: *See—*
Briggs, George Roland, 4,024,476.
Derenbecher, William Joseph, Jr., 4,024,572.
Dischert, Robert Adams; and Walter, James Morgan, 4,024,571.
Hawrylo, Frank Zygmunt; and Kressel, Henry, 4,024,569.
Larach, Simon, 4,024,069.
Pistiner, Josef Siegfried; Muhlfelder, Ludwig; and Keigler, John Edward, 4,023,752.
Ross, Daniel Louis; and Barton, Lucian Anthony, 4,024,122.
Recognition Equipment Incorporated: *See—*
McJohnson, Robert B., 4,024,511.
Sanner, Medford D.; McMillan, Robert M.; and Cave, Ellis K., 4,024,578.
Redel, Karl-Georg, to Leybold-Heraeus GmbH & Co. KG. Device for measuring the evaporation rate in vacuum evaporation processes. 4,024,376, Cl. 219-272.000.
Reed, Russell, Jr.; and Cornia, Richard P., to Thiokol Corporation. Extinguishable propellant composition. 4,023,995, Cl. 149-19.300.
Reeder, Thomas Macklin; and Grudkowski, Thomas Walter, to United

Technologies Corporation. Programmable, amplitude and phase, general transversal filter. 4,024,480, Cl. 333-70.00T.

Reese, Stanton L. Vehicle for transporting container for materials that need to be handled with care. 4,023,615, Cl. 165-41.000.

Regie Nationale des Usines Renault: *See—*
Dressler, Bruno, 4,023,420.

Reid Dominion Packaging Ltd.: *See—*
Perkins, William, 4,023,759.

Reid, Karl N., Jr.: *See—*
Woods, Robert L.; Reid, Karl N., Jr.; and Gunda, Rajamouli, 4,023,442.

Reid, Neil M.: *See—*
French, John Barry; Reid, Neil M.; and Buckley, Janette A., 4,023,398.

Reid, Walter: *See—*
Jepson, John W.; Reid, Walter; and Brown, Robert A., 4,023,802.

Reijnen, Wilhelmus Adrianus Petrus: *See—*
Sittardt, Hans Gunter; Stotz, Siegfried; Zwanenburg, Dirk Jan; and Reijnen, Wilhelmus Adrianus Petrus, 4,024,084.

Reiner, Lawrence L.; and McNett, John P., to Reiner, Lawrence L. Dispenser for cards and the like. 4,023,705, Cl. 221-186.000.

Reisacher, Josef. Reciprocating-piston-type internal combustion engine particularly for the operation of passenger automobiles. 4,023,547, Cl. 123-196.00R.

Reisner, David B.; Ludwig, Bernard J.; Bates, Harold M.; and Berger, Frank M., to Carter-Wallace, Inc. 2,3,4,4a-Tetrahydro-10H-1,2-oxazino[3,2-b](1,3)benzoxazin-10-ones. 4,024,139, Cl. 260-244.00R.

Reitano, Philip A.: *See—*
Glamkowski, Edward J.; and Reitano, Philip A., 4,024,258.

Rejeski, William E., to Wiremold Company, The. Tubular joint and the product formed thereby. 4,023,589, Cl. 138-149.000.

Remshardt, Rolf: *See—*
Heuber, Klaus; Najmann, Knut; Remshardt, Rolf; and Tertel, Klaus, 4,024,417.

Remsuk Ventures Limited: *See—*
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Republic Steel Corporation: *See—*
Vild, Joseph P.; Cleary, William I.; and Fox, Donald P., 4,024,470.

Research and Development Laboratories of Ohno Co., Ltd.: *See—*
Ohno, Genji; and Inoue, Eiichi, 4,023,898.

Reshetova, Galina Vasilievna: *See—*
Khadzhi, Valentin Evstafievich; and Reshetova, Galina Vasilievna, 4,024,013.

Restaino, Alfred J.: *See—*
Phalangas, Charalambos J.; Restaino, Alfred J.; and Yun, Han Bo, 4,024,040.

Retka, Thomas J.; and Wagner, Wayne M., to Donaldson Company, Inc. Method and apparatus for reducing aerodynamic whistle. 4,023,645, Cl. 181-48.000.

Retzow, Karl-Heinz: *See—*
Blunck, Otto; Seim, Burkhart; Retzow, Karl-Heinz; and Zorner, Karl-Heinz, 4,023,930.

Reuland, Joachim, to Hauni-Werke Korber & Co., KG. Method and apparatus for measuring and regulating the density of rod-like fillers consisting of tobacco or the like. 4,024,394, Cl. 250-308.000.

Reuschel, Konrad, to Siemens Aktiengesellschaft. Reaction container for deposition of elemental silicon. 4,023,520, Cl. 118-8.000.

Revlon-Realistic Professional Products, Inc.: *See—*
Forbriger, Arthur W.; and Meyerhoefer, Carl E., 4,023,718.

Rex Industrial Co., Ltd.: *See—*
Miyagawa, Fumiko, 4,023,211.

Reynolds, Charles A.; Mentelos, Richard A.; and Lewis, Donald E., to American Home Products Corporation. Apparatus and method for determining onset times of pulses and use thereof in computing interarterial blood pressure electromechanical interval. 4,023,563, Cl. 128-2.05R.

Reynolds Metals Company: *See—*
Wong, Lip F., 4,023,841.

Rheem Manufacturing Company: *See—*
Phares, Michael W., 4,023,238.

Rheinmetall G.m.b.H.: *See—*
Fischer, Siegmar; Silligmann, Karl-Heinz; and Prochnow, Juergen, 4,023,495.

Rhone-Poulenc Industries: *See—*
Sausse, Andre, 4,024,059.
Thomas, Philippe; Meyer, Jacques; and d'Avigneau, Jacques Marie, 4,024,111.

Rhone-Poulenc S.A.: *See—*
Blind, Andre; and Linares, Hubert, 4,024,127.

Rhone-Poulenc-Textile: *See—*
Isoard, Bernard, 4,023,399.
Laderach, Paul; Michalet, Charles; and Rigaud, Jean, 4,023,339.

Rhyn, Elmer J.: *See—*
Vetter, Ronald F.; Diebold, James P.; Sieg, George F.; Gerrish, Howard W., Jr.; Payne, Howard H.; Rhyn, Elmer J.; and Witcosky, Irvin F., 4,023,354.

Ribka, Joachim, to Hoechst Aktiengesellschaft. Monoazo acetoacetylaminobenzimidazolone pigments containing carboxy group. 4,024,124, Cl. 260-157.000.

Ribka, Joachim: *See—*
Kunstmann, Walter; and Ribka, Joachim, 4,024,125.

Richard Morganstern Inc.: *See—*
Skoff, Roger E., 4,024,388.

Richard, Walter A. Flying ship. 4,023,751, Cl. 244-23.00C.

Richards, Gerald P., to Raytheon Company. Second difference function generator. 4,024,385, Cl. 235-152.000.

Richardson, George E.: *See—*
Bachur, Gerald; and Richardson, George E., 4,024,428.

Richardson, Timothy W.: *See—*
Megles, John E., Jr.; and Richardson, Timothy W., 4,023,953.

Ricoh Co., Ltd.: *See—*
Hayashi, Toshio; and Haruyama, Osamu, 4,023,899.

Riddle, Grant C. Hard-firing zero-crossing trigger control circuit. 4,024,457, Cl. 323-35.000.

Ridgway, James S., to Monsanto Company. Copolyamides derived from cyclohexanebis(ethylamine). 4,024,114, Cl. 260-78.00R.

Ridler, Keith Douglas: *See—*
Edge, Gordon Malcom; Ridler, Keith Douglas; and Easthope, Frederick James, 4,024,473.

Riegler, Ernst; and Schmidt, Manfred, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Tiltable metallurgical converter arrangement. 4,023,785, Cl. 266-245.000.

Rieter Machine Works, Ltd.: *See—*
Schar, Hugo, 4,023,741.

Rieth, Kurt Albert, to Textron, Inc. Spring loaded buckles. 4,023,240, Cl. 24-188.000.

Riffel, Fritz: *See—*
Braun, Hartmut; Riffel, Fritz; and Hartung, Walter, 4,024,393.

Rigaud, Jean: *See—*
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Rigo, Gualtiero: *See—*
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Rihs, Jorg: *See—*
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Riley, Anthony Leonard Mark: *See—*
Monks, Reginald; Riley, Anthony Leonard Mark; and Cree, Gavin Murray, 4,024,234.

Riley, William H.; and Hendricks, Herman J., to Dow Chemical Company, The. Oral hygiene method. 4,024,238, Cl. 424-51.000.

Ritter, Gerhard; and Ritter, Klaus, to Evg Entwicklungs-u Verwertungsgesellschaft, Firma. Method of producing wire mesh. 4,023,600, Cl. 140-112.000.

Ritter, Klaus: *See—*
Ritter, Gerhard; and Ritter, Klaus, 4,023,600.

Rizzo, Catherine L.; and Rizzo, Joseph. Tire removing device and method. 4,023,820, Cl. 280-288.000.

Rizzo, Joseph: *See—*
Rizzo, Catherine L.; and Rizzo, Joseph, 4,023,820.

Robert Bosch G.m.b.H.: *See—*
Brill, Klaus; Traub, Eberhard; Ortlieb, Alfred; Grothe, Wolfgang; and Scholl, Friedrich, 4,024,546.
Hankel, Rainer, 4,024,418.
Maurer, Helmut; and Keerl, Karl Heinz, 4,023,358.
Wossner, Gunter; Zweng, Josef; and Linder, Ernst, 4,023,360.

Robert, Marcel: *See—*
Prillieux, Marcel; Robert, Marcel; and Tirtiaux, Robert, 4,023,980.

Roberts, Wendell E. Large game carrier. 4,023,844, Cl. 294-26.000.

Robertshaw Controls Company: *See—*
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Robey, Melvin J., to Purdue Research Foundation. System and process for providing durability enhanced area. 4,023,506, Cl. 111-1.000.

Robinson, Gerard A. Swivel chair. 4,023,760, Cl. 248-188.200.

Robinson, Glen: *See—*
Perkin, Gregg S.; Robinson, Glen; and Thometz, Theodore G., 4,023,630.

Robson, Ronald C.: *See—*
Luke, Robert J.; and Robson, Ronald C., 4,023,412.

Rockwell International Corporation: *See—*
Champagne, Ralph R., 4,023,747.
Chen, Thomas T., 4,024,517.
Dibble, Gordon L.; and Russell, Stewart T., 4,023,389.
Pelley, Arlo D., 4,024,463.

Rodgers Organ Company: *See—*
Kirkwood, George T.; Castle, Patrick M.; and Whitney, John T., 4,023,457.

Rodrigues, John J.: *See—*
Rakowicz, Maurice R.; and Rodrigues, John J., 4,024,064.

Roe, Harry James. Backhoe compactor/scraper apparatus and method. 4,023,288, Cl. 37-117.500.

Rogalski, Werner; Kirchlechner, Richard; Seubert, Jurgen; Gottschlich, Rudolf; Steinigeweg, Rosmarie; Bergmann, Rolf; Wahlig, Helmut; and Gante, Joachim, to Merck Patent Gesellschaft mit beschrankter Haftung. Tetracyclic compounds. 4,024,272, Cl. 424-275.000.

Rogers, James H., to Mac Manufacturing Company. High speed bottle transfer machine. 4,023,666, Cl. 198-449.000.

Rogers, Russell L.; and Buseth, Richard A., to Aeroquip Corporation. Frangible valved fitting. 4,023,584, Cl. 137-68.00R.

Rogner, Thomas; and Sauka, Klaus, to Voith Turbo KG. Controllable-filling hydrodynamic fluid coupling. 4,023,362, Cl. 60-347.000.

Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, to Bayer Aktiengesellschaft. Halogenated 4-trifluoromethyl-diphenyl-ether compounds and herbicidal compositions. 4,023,958, Cl. 71-103.000.

Rohm and Haas Company: *See—*
Emmons, William D., 4,024,117.
Mercurio, Andrew; and Lewis, Sheldon N., 4,023,977.

Roland, George W.: *See—*
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Roland Offsetmaschinenfabrik Faber & Schleicher AG: *See—*
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Roman, Steven A., to Shell Oil Company. Alpha-(halophenoxy)acetyl nitromethylene tetrahydrothiazines. 4,024,138, Cl. 260-243.00R.
Roman, Steven A., to Shell Oil Company. S-Esters of nitro(tetrahydro-2H-1,3-thiazin-2-ylidene)ethanethioic acid. 4,024,254, Cl. 424-246.000.
Ronk, Gary M.: *See—*
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Rosenquist, Kurt E., to Louver Drape, Inc. Drapery track. 4,023,609, Cl. 160-343.000.
Ross, Alan Malcolm, to Atomic Energy of Canada Limited. Uranium-base alloys. 4,023,992, Cl. 148-132.000.
Ross, Charles C., to United States of America, Navy. Null balance alphameter. 4,023,909, Cl. 356-205.000.
Ross, Daniel Louis; and Barton, Lucian Anthony, to RCA Corporation. Method of purifying 2,4-bis(6-diazo-5,6-dihydro-5-oxo-1-naphthalenesulfonyloxy benzophenone). 4,024,122, Cl. 260-141.000.
Ross, Stephen T.: *See—*
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Rotter, Gerhard: *See—*
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Rouillier, Daniel L.: *See—*
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Roussel-UCLAF: *See—*
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Martel, Jacques; Buendia, Jean; and Toromanoff, Edmond, 4,024,172.
Rovani, William, to Pepsico, Inc. Shock-absorbing system for protective equipment. 4,023,213, Cl. 2-413.000.
Rowe International Inc.: *See—*
Pitel, Irving; Silverman, Richard S.; and Mueller, Richard J., 4,023,704.
Rowland, Stanley P.: *See—*
Franklin, William E.; and Rowland, Stanley P., 4,024,099.
Royal, Thomas B., to International Paper Company. Apparatus for assembling a carton. 4,023,471, Cl. 93-39.00R.
Rucker Company, The: *See—*
Piccardo, Jack E., 4,023,593.
Ruggieri, Nicola, Jr. Collapsible window greenhouse. 4,023,306, Cl. 47-40.000.
Ruppel, Raymond A.; Fagle, Joseph Z.; and Blagrave, Theodore W. Trailer protector light system. 4,024,497, Cl. 340-74.000.
Russ, Karl J.; and Broughton, Donald R., to Catalysts and Chemicals Inc. Carbon and erosion-resistant catalyst. 4,024,075, Cl. 252-466.00J.
Russell, Donald Henry; and Lenton, Robert Warren, to Atlantic Richfield Company. Stabilized ethylene-carbon monoxide copolymers. 4,024,104, Cl. 260-45.80R.
Russell, Stewart T.: *See—*
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Russell, Walter, to Laboratory Furniture, Inc. Fume hood. 4,023,473, Cl. 98-115.0LH.
Rutkovsky, Michael V.: *See—*
Palka, James J.; and Rutkovsky, Michael V., 4,023,872.
Ryan, James Ernest: *See—*
Moilliet, John Lewis; and Ryan, James Ernest, 4,024,089.
Ryan, John W.; and Moore, James D. Inboard derailleur for multispeed bicycles. 4,023,424, Cl. 74-217.00B.
Ryan, Paul A.; and Spitzer, Nicholas, to Dytronics Company, Inc. Stormscope. 4,023,408, Cl. 73-170.00R.
Ryan, William J. Riser mooring system. 4,023,517, Cl. 114-230.000.
Rydberg, Sverker. Anti-slip device for footware. 4,023,284, Cl. 36-59.00R.
Rygalin, Viktor Georgievich: *See—*
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S.S. Adams Company: *See—*
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Saab-Scania Aktiebolag: *See—*
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Sabec, Charles J., to Towmotor Corporation. Work vehicle protective cover. 4,023,838, Cl. 296-102.000.
Sack, Wolfhard: *See—*
Weigand, Hanfried; Bellmann, Bernhard; Muller-Gerbes, Henning; Sack, Wolfhard; and Theimert, Paul-Heinz, 4,023,572.
Saijo, Kinji: *See—*
Nomura, Giichiro; Ando, Takuo; Ariga, Keiji; Ikeda, Akira; Saijo, Kinji; and Sato, Taizo, 4,023,987.
Saiki, Shinishi: *See—*
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Saino, Emilio; Patritti, Raffaele; and Toscani, Giorgio, to Montefibre, S.p.A. Device for detecting the breakage of yarn in drawing frames and spinning frames. 4,023,341, Cl. 57-81.000.
Saito, Katsuhide: *See—*
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, 4,024,280.
Saitou, Tadashi: *See—*
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Sakai, Tetsuo, to Nippon Hoso Kyokai. Image display device. 4,024,529, Cl. 340-324.00M.
Sakai, Toshimitsu; Fukumura, Kagenori; and Saitou, Tadashi. Fluid pressure control system for automatic power transmission. 4,023,447, Cl. 74-869.000.
Sakakura, Mitsuo: *See—*
Ohmori, Yasuo; Sakakura, Mitsuo; and Miyajima, Hajime, 4,024,081.
Sakamoto, Akehiro; and Watanabe, Yoshio, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Combustion chamber for internal-combustion engine. 4,023,541, Cl. 123-32.00E.
Sakamoto, Yoichi: *See—*
Kubo, Takao; Ohtani, Tadao; Kojima, Shigeru; Kato, Nobuyuki; Kojima, Kiyoshi; Sakamoto, Yoichi; Konno, Isago; and Tsukahara, Masaharu, 4,023,991.
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Sakasita, Yoshihiro: *See—*
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Salk, Donald, to Sheldahl, Inc. Alarm indicator circuit using indicator lamps. 4,024,521, Cl. 340-253.00B.
Salloum, Charles R. Container handling structure. 4,023,687, Cl. 214-16.40R.
Salmi, Pekka; and Strom, Rolf, to Oy Tampella AB. Self-adaptive hydraulic rock drill. 4,023,626, Cl. 173-8.000.
Sam Stein Associates, Inc.: *See—*
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Sanada, Akihiko: *See—*
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Sanner, Medford D.; McMillan, Robert M.; and Cave, Ellis K., to Recognition Equipment Incorporated. Scan control and sensor sampling system for self-scanned photosensor arrays. 4,024,578, Cl. 358-213.000.
Santianni, Blaise F. Electric game set. 4,023,807, Cl. 273-130.0AB.
Sarazin, Richard George; and Olson, Larry Dale, to Universal Oil Products Company. Laminated absorber member for flat plate solar collector and method of making same. 4,023,556, Cl. 126-271.000.
Sarrasin, Maurice O. Hockey puck tethering device. 4,023,797, Cl. 273-1.00B.
Sato, Akira: *See—*
Nakagawa, Ryuichi; Ueda, Takuya; Yoshimatsu, Shiro; Sato, Akira; Mitsui, Tatsuro; Ozaki, Tsuyoshi; and Fukuzawa, Akira, 4,023,962.
Sato, Suguru; and Mori, Kazumasa, to Nippondenso Co., Ltd. Generator system with speed responsive output winding switching device. 4,024,456, Cl. 322-29.000.
Sato, Taizo: *See—*
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Satomi, Takeo: *See—*
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Satzinger, Gerhard; Hartenstein, Johannes; Herrmann, Manfred; and Heldt, Wolfgang, to Warner-Lambert Company. Cyclic amino acids. 4,024,175, Cl. 260-468.00J.
Sauer, Gerhard; Eder, Ulrich; Haffer, Gregor; Neef, Gunter; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Process for the preparation of 13β-alkyl-4-gonene-3,17-diones. 4,024,166, Cl. 260-397.300.
Sauermilch, Rolf: *See—*
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Sauka, Klaus: *See—*
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Saul, David M., to Rack Engineering Company. Cantilever rack structure. 4,023,684, Cl. 211-193.000.

Saunders, James Warren, to PACCAR Inc. Center tow pin assembly. 4,023,823, Cl. 280-515.000.

Sausse, Andre, to Rhone-Poulenc Industries. Artificial kidney. 4,024,059, Cl. 210-195.00R.

Savin Business Machines Corporation: *See—*
Hori, Tatsu; Gardiner, Kenneth W.; and Mangal, Norman F., 4,023,791.

Sayles, David C., to United States of America, Army. High nitrogen content gas generant and method of producing near-neutral combustion products. 4,023,352, Cl. 60-218.000.

SCAL - Societe de Conditionnements en Aluminum: *See—*
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Scala, Robert H.: *See—*
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Scardefield, John Edward: *See—*
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Schafer, Anton; and Probst, Karl, to Lindemann Maschinenfabrik GmbH. Baling press. 4,023,484, Cl. 100-215.000.

Schally, Andrew V.; and Coy, David H. (Pyro)-Glu-His-Trp-D-Ser-Tyr-D-Leu-Leu-Arg-Pro-NHR and intermediates. 4,024,121, Cl. 260-112.5LH.

Schappel, Robert Edouard: *See—*
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Schar, Hugo, to Rieter Machine Works, Ltd. Apparatus for winding a multiplicity of threads onto respective bobbin tubes. 4,023,741, Cl. 242-18.00R.

Schardt, Richard: *See—*
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Schatzler, Walter: *See—*
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Scheib, Harold A., to Bell & Howell Company. Light composer for providing even field illumination and diffuse light. 4,023,903, Cl. 355-71.000.

Schelhas, Karlheinz: *See—*
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Schell, Frederick S.: *See—*
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Schenher, Michel Bernard: *See—*
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Schenkel, Erwin. Ring spinning or twisting process. 4,023,342, Cl. 57-156.000.

Scherbaum, Friedrich, to Siemens Aktiengesellschaft. Thyristor cooling arrangement. 4,023,616, Cl. 165-80.000.

Schering Aktiengesellschaft: *See—*
Sauer, Gerhard; Eder, Ulrich; Haffer, Gregor; Neef, Gunter; and Wiechert, Rudolf, 4,024,166.

Schilling, Keith L.: *See—*
Lisnay, Albert D.; and Schilling, Keith L., 4,024,482.

Schippers, Heinz, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Textile machine, especially spinning machine. 4,023,743, Cl. 242-35.50A.

Schlegel Corporation: *See—*
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Schlichting, Karl; Beer, Ludwig; and Seydl, Wolfgang, to BASF Aktiengesellschaft. Antistatic polybutylene terephthalate molding compositions containing alkoxylated polyamide. 4,024,204, Cl. 260-857.0PE.

Schlom, Leslie A.; Dubey, Michael B.; and Becwar, Andrew J. Evaporative refrigeration system. 4,023,949, Cl. 62-309.000.

Schmidt, Charles H., Jr.: *See—*
Punnett, Frazer D.; Schmidt, Charles H., Jr.; and Tates, Donald W., 4,023,792.

Schmidt, Hermann: *See—*
Seidel, Horst; Dahlmann, Horst; Bothe, Rolf; and Schmidt, Hermann, 4,023,960.

Schmidt, Horst: *See—*
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Schmidt, John, Jr.; and Aryamane, Avinash, to Littelfuse, Inc. Method of making miniature plug-in fuses of different fuse ratings. 4,023,264, Cl. 29-623.000.

Schmidt, Manfred: *See—*
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Schmidt, Robert Rudolf: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,023,958.

Schmucker, Donald H.; and Toffolo, Dominic S., to United States of America, Navy. A.C.-powered, commutated electric motor. 4,024,443, Cl. 318-175.000.

Schnebly, Fred H., to Northrop Corporation. Vacuum lifter. 4,023,845, Cl. 294-64.00R.

Schneider, Felix Horst: *See—*
Homann, Thorsten; Schneider, Felix Horst; and Weber, Dietmar, 4,024,168.

Schneider, Martin Victor, to Bell Telephone Laboratories, Incorporated. Method of manufacturing semiconductor diodes for use in millimeter-wave circuits. 4,023,260, Cl. 29-578.000.

Schneider, Martin Victor: *See—*
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Schneider, Peter: *See—*
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Schneider, Richard N., to Cryo-Power, Inc. Isothermal open cycle thermodynamic engine and method. 4,023,366, Cl. 60-671.000.

Schneider, Sol, to United States of America, Army. Modulator and clamper for variable impedance load. 4,024,430, Cl. 315-289.000.

Schnell, Gunter, to Gebr. Eickhoff, Maschinenfabrik und Eisengieserei m.b.H. Method and apparatus for controlling a tunneling machine. 4,023,861, Cl. 299-1.000.

Schnell, Karl. Apparatus and method for processing meat and bone pieces. 4,023,735, Cl. 241-22.000.

Schoefberger, Georg: *See—*
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Scholl, Friedrich: *See—*
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Scholnick, Seymour A.: *See—*
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Schomburg, Wilhelm; and Schmidt, Horst, to Siemens Aktiengesellschaft. Specimen cartridge for a particle beam device. 4,024,402, Cl. 250-442.000.

Schora, Frank C.; Loeding, John W.; and Patel, Jitendra G., to Institute of Gas Technology. Valve for ash agglomeration device. 4,023,280, Cl. 34-10.000.

Schramm, Jurgen: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,023,958.

Schreckling, Kurt: *See—*
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Schreiber, William L.: *See—*
Hruza nee Sanderson, Anne; Schreiber, William L.; van Praag, Michel; Pittet, Alan O.; and Evers, William J., 4,024,190.

Schroeder, Becky J., to Schroeder, Becky J. Electroluminescent backing sheet for reading and writing in the dark. 4,024,404, Cl. 250-462.000.

Schubecker, Archim: *See—*
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Schuette, John W.: *See—*
Gilbert, Lawrence A.; and Schuette, John W., 4,024,078.

Schuil, Roelof Egbert, to U.S. Philips Corporation. Method of manufacturing a cerium activated luminescent rare-earth aluminate. 4,024,070, Cl. 252-301.40R.

Schultz, Robert S. Pressure-operated container for viscous products. 4,023,717, Cl. 222-386.500.

Schulz, Hans Peter: *See—*
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Schulze, Helmut: *See—*
Brahm, Helmut; and Schulze, Helmut, 4,024,307.

Schuman, Paul D.; and Anderson, Roy, to PCR, Inc. Silylation of 5-fluoro-6-hydroxy or alkoxy pyrimidine. 4,024,143, Cl. 260-251.00R.

Schumann, Gunter: *See—*
Johne, Hans; Jentzsch, Arndt; and Schumann, Gunter, 4,023,423.

Schutz, Ewald, to Power Transfer Corporation. Power transfer. 4,023,433, Cl. 74-425.000.

Schwarte, Jurgen: *See—*
Juntgen, Harald; Knoblauch, Karl; Grochowski, Horst; and Schwarte, Jurgen, 4,023,939.

Schwartz, Arie: *See—*
Zor, Uriel; Lindner, Hans Rudolph; and Schwartz, Arie, 4,024,279.

Schwartz, David: *See—*
Cohen, Seymour; Klar, Norman; and Schwartz, David, 4,023,235.

Schwartzman, Everett H. Rectification system for the separation of fluids. 4,023,946, Cl. 62-40.000.

Schwarz, Joachim-Ullrich: *See—*
Hartmann, Gunter; Schwarz, Joachim-Ullrich; and Keil, Klaus, 4,024,570.

Schweizer, August: *See—*
Frei, Alfred; Schoefberger, Georg; and Schweizer, August, 4,023,924.

Sciaky Bros., Inc.: *See—*
Sciaky, David, 4,024,370.

Sciaky, David, to Sciaky Bros., Inc. Toroidal resistance welding transformer. 4,024,370, Cl. 219-90.000.

Scifres, Donald R.; Streifer, William; and Burnham, Robert D., to Xerox Corporation. Method of making an electrically pumped solid-state distributed feedback laser. 4,023,993, Cl. 148-172.000.

Scoggin, Jack S., to Phillips Petroleum Company. Fractional distillation process. 4,024,191, Cl. 260-609.00D.

Scott, Dale K.: *See—*
Calvert, Rodney K.; and Scott, Dale K., 4,023,328.

Scott & Fetzer Company (France Division), The: *See—*
MacAskill, Robert Bruce, Jr., 4,024,412.

Scott, Howard L.: *See—*
McClain, James E.; and Scott, Howard L., 4,024,439.

Scott Paper Company: *See—*
Cressey, Philo Burton, Jr., 4,024,313.
Touchette, Albert F., 4,023,789.

Sebastian Messerschmidt Spezial-maschinenfabrik: *See—*
Messerschmidt, Klaus, 4,023,393.

Sedziak, Anthony Z., to Penn-Erie Manufacturing Company. Injection molding die system. 4,023,770, Cl. 249-107.000.

Seidel, Harold, to Bell Telephone Laboratories, Incorporated. Integrated solid state isolator circuit. 4,024,452, Cl. 321-2.000.

Seidel, Horst; Dahlmann, Horst; Bothe, Rolf; and Schmidt, Hermann, to Metallgesellschaft Aktiengesellschaft. Process for cleaning waste gases from sintering plants. 4,023,960, Cl. 75-5.000.

Seiden, Lewis J.: *See*—
Morgan, A. Henry; and Seiden, Lewis J., 4,024,362.

Seider, Gene J.: *See*—
Christianson, Clinton C.; and Seider, Gene J., 4,024,448.

Seim, Burkhart: *See*—
Blunck, Otto; Seim, Burkhart; Retzow, Karl-Heinz; and Zorner, Karl-Heinz, 4,023,930.

Sekine, Masaoki; and Shiba, Haruo. Endless tape cartridge. 4,023,745, Cl. 242-55.19A.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See*—
Honda, Seiichirou; Hata, Hiroyoshi; Simura, Yosimasa; and Une, Soichi, 4,024,213.

Selby, Irma I., executrix: *See*—
Selby, Robert M., deceased, 4,023,222.

Selby Manufacturing Company, Inc. (Entire): *See*—
Selby, Robert M., deceased, 4,023,222.

Selby, Robert M., deceased (by Selby, Irma I., executrix), to Selby Manufacturing Company, Inc. (Entire). Pontoon boat with retractable running gear. 4,023,222, Cl. 9-1.200.

Sempuku, Kenji: *See*—
Murai, Hiromu; Ohata, Katsuya; Enomoto, Hiroshi; Sempuku, Kenji; Kitaguchi, Koji; Fujita, Yukio; Yoshikuni, Yoshiaki; Kura, Kohei; Saito, Katsuhide; Mori, Tamiki; and Yasutomi, Yasuo, 4,024,280.

Sena, Ernest H. Extension arm for paint spraying devices. 4,023,711, Cl. 222-174.000.

Sensonics, Inc.: *See*—
DeMayo, John F., 4,023,527.

Service Distributors, Inc.: *See*—
Pfost, R. Fred; and Breeze, Eric G., 4,024,379.

Servo Chem AB: *See*—
Enfors, Sven Olof; Molin, Nils Ludvig; Mosbach, Klaus Hermann; and Nilsson, Hans Jorgen, 4,024,042.

Servos, Gerald H. Water caloric systems and methods for inducing nystagmus. 4,023,561, Cl. 128-2.10R.

Setz, Walter: *See*—
Grunder, Hans; and Setz, Walter, 4,023,472.

Seubert, Jurgen: *See*—
Rogalski, Werner; Kirchlechner, Richard; Seubert, Jurgen; Gottschlich, Rudolf; Steinigeweg, Rosmarie; Bergmann, Rolf; Wahlig, Helmut; and Garte, Joachim, 4,024,272.

Sextro, Gunter; Burg, Karlheinz; and Wolters, Ernst, to Hoechst Aktiengesellschaft. Process for preparing a stabilized oxymethylene copolymer. 4,024,105, Cl. 260-45.85R.

Seydl, Wolfgang: *See*—
Schlichting, Karl; Beer, Ludwig; and Seydl, Wolfgang, 4,024,204.

Shade Information Systems, Inc.: *See*—
Tess, Thomas H., 4,023,727.

Shaefer, Archie B.: *See*—
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., 4,024,523.

Shamash, Maurice B.: *See*—
Lindberg, Frank A.; Konsowski, Stephen G.; Shamash, Maurice B.; and Ponemone, Seymour J., 4,023,999.

Shane, Hugh J. S.; Schell, Frederick S.; and Kasem, Mohammad A., to Hart Chemical Limited. Water-dispersible defoamer composition. 4,024,072, Cl. 252-358.000.

Shapiro, Justin Joel. Micro-dispensing liquid pipet. 4,023,716, Cl. 222-309.000.

Shapiro, Leonard: *See*—
Tyson, Ronald S.; and Shapiro, Leonard, 4,024,148.

Sharp Kabushiki Kaisha: *See*—
Kanatani, Yoshiharu; Ise, Masahiro; and Mizukami, Etsuo, 4,024,389.
Tateishi, Iwao; and Maegawa, Toshiyuki, 4,024,384.

Shattuck, Ronald Corroalles, to Litton Systems, Inc. Switch assembly having selective actuation sensitivity. 4,024,368, Cl. 200-314.000.

Shaw, Bryan; and Winterton, Neil, to Imperial Chemical Industries Limited. Treatment of glass. 4,023,951, Cl. 65-30.00R.

Shaw, Paul W. Nut husking apparatus. 4,023,478, Cl. 99-628.000.

Shea, Richard J.: *See*—
Hebert, Roger T.; Pappas, John A.; and Shea, Richard J., 4,023,893.

Sheets, Ronald E., to Tamarack Scientific Co. Inc. Optical microcircuit printing process. 4,023,904, Cl. 355-132.000.

Sheldahl, Inc.: *See*—
Salk, Donald, 4,024,521.

Shell, Don C.; and Hayward, Edward C., to Nalco Chemical Company. Organophosphorous antifoulants in hydrodesulfurization. 4,024,048, Cl. 208-48.0AA.

Shell, Don C.; and Hayward, Edward C., to Nalco Chemical Company. Mono and di organophosphite esters as crude oil antifoulants. 4,024,049, Cl. 208-48.0AA.

Shell, Don C.; and Hayward, Edward C., to Nalco Chemical Company. Phosphorous ester antifoulants in crude oil refining. 4,024,050, Cl. 208-48.0AA.

Shell, Don C.; and Hayward, Edward C., to Nalco Chemical Company. Using an antifoulant in a crude oil heating process. 4,024,051, Cl. 208-348.000.

Shell Oil Company: *See*—
Blytas, George C.; and Curtis, Richard M., 4,024,400.
Luke, Robert J.; and Robson, Ronald C., 4,023,412.
Roman, Steven A., 4,024,138.
Roman, Steven A., 4,024,254.
Shryne, Thomas M.; and Kim, Leo, 4,024,165.
Soloway, Samuel B.; and Payne, George Bernson, 4,024,161.

Sheridon, Nicholas K., to Xerox Corporation. Deformable elastomer imaging member employing an internal opaque deformable metallic layer. 4,023,969, Cl. 96-1.500.

Sherrill, Harry. Tricky disk. 4,023,805, Cl. 273-106.00B.

Sherwin, Richard N. Character module for automatic sign. 4,024,532, Cl. 340-336.000.

Shiba, Haruo: *See*—
Sekine, Masaoki; and Shiba, Haruo, 4,023,745.

Shibata, Osamu; and Taniguchi, Hitoshi, to Fuji Oil Company Ltd. Stabilization of β-amylase in aqueous medium. 4,024,000, Cl. 195-63.000.

Shibata, Ryoji; and Shibata, Zenzaburo. Binder loose leaf. 4,023,292, Cl. 40-158.00R.

Shibata, Zenzaburo: *See*—
Shibata, Ryoji; and Shibata, Zenzaburo, 4,023,292.

Shields, James G.: *See*—
Garcia, George E., 4,023,415.

Shimada, Takashi; Saiki, Shinishi; and Kayanuma, Akio, to Sony Corporation. Semiconductor device having at least one PN junction and channel stopper surrounder by a protecture conducting layer. 4,024,564, Cl. 357-53.000.

Shimazu, Shinichi: *See*—
Fujita, Tatsu; Yamada, Yoshiro; Mizuta, Atsuo; Yamada, Tetsuo; Tsuda, Osamu; Kaneda, Tsugio; Shimazu, Shinichi; and Wada, Yukio, 4,023,392.

Shimizu, Hirohiko; and Ozawa, Hitoshi, to Toray Industries, Inc. Hydrogel and production thereof. 4,024,073, Cl. 252-316.000.

Shimizu, Munetaka: *See*—
Inoue, Nobuyoshi; and Shimizu, Munetaka, 4,024,556.

Shimonuri, Kiyomi: *See*—
Okuyama, Toshiki; Kawagoshi, Sakae; Ikemi, Tadashi; and Shimonuri, Kiyomi, 4,024,079.

Shin-Etsu Chemical Company Limited: *See*—
Takamizawa, Minoru; Abe, Akira; Inoue, Yoshio; and Yoshioka, Hiroshi, 4,024,306.

Shindler, Harry, to Infranor S.A. Nuclear accident carrier. 4,023,219, Cl. 5-82.00R.

Shinkado, Yukio: *See*—
Ban, Itsuki; Nozaki, Sumio; Kasuya, Takanori; Shinkado, Yukio; and Yano, Kanji, 4,024,582.

Shirasu, Shinichi; and Nomura, Yasushi, to Citizen Watch Co., Ltd. Electro-transmissive display device. 4,023,890, Cl. 350-160.0LC.

Short, Don L.; and Short, Steven L. Valve of particulated material for vertical forced air channel. 4,023,591, Cl. 137-533.000.

Short, Steven L.: *See*—
Short, Don L.; and Short, Steven L., 4,023,591.

Shryne, Thomas M.; and Kim, Leo, to Shell Oil Company. Process for the epoxidation of olefins. 4,024,165, Cl. 260-348.50L.

Shultz, Gilbert F., to Whitlock, Inc. Regeneration cycle control for industrial air dryer. 4,023,940, Cl. 55-163.000.

Shutt, Donald P., to Western Gear Corporation. Winch with cable tensioning device operable during reeling out and reeling in. 4,023,744, Cl. 242-54.00R.

Sica, Louis, Jr., to United States of America, Navy. Compact three-beam interferometer. 4,023,906, Cl. 356-113.000.

Siden, Dennis C.; and McMills, Corey J., to Raychem Corporation. Non-shorting wire cutter. 4,023,272, Cl. 30-257.000.

Sieg, George F.: *See*—
Vetter, Ronald F.; Diebold, James P.; Sieg, George F.; Gerrish, Howard W., Jr.; Payne, Howard H.; Rhyn, Elmer J.; and Witcosky, Irvin F., 4,023,354.

Siemens Aktiengesellschaft: *See*—
Beckmann, Oskar, 4,024,474.
Doring, Christfried; Thomas, Johann; Volcker, Manfred; Sparwald, Volker; and Habersack, Walter, 4,024,034.
Hartmann, Gunter; Schwarz, Joachim-Ullrich; and Keil, Klaus, 4,024,570.
Hartwig, Gerhard, 4,024,366.
Marsing, Helmut; Parsch, Claus-Peter; and Franksen, Holger, 4,024,363.
Ohlsson, Thomas, 4,023,565.
Reuschel, Konrad, 4,023,520.
Scherbaum, Friedrich, 4,023,616.
Schomburg, Wilhelm; and Schmidt, Horst, 4,024,402.

Sierk, Raymond H., to Abex Corporation. Detachable wear pad for the third rail shoe on an electric railway car. 4,023,658, Cl. 191-49.000.

SIG Schweizerische Industrie-Gesellschaft: *See*—
Fluck, Rene, 4,024,381.

Sigmon, Ned A., to Liggett & Myers Incorporated. Method and apparatus for making a hollow filter and a filter rod. 4,024,012, Cl. 156-441.000.

Silligmann, Karl-Heinz: *See*—
Fischer, Siegmar; Silligmann, Karl-Heinz; and Prochnow, Juergen, 4,023,495.

Siltanen, Clyde W.: *See*—
Thorne, John K.; Province, Gary L.; and Siltanen, Clyde W., 4,023,557.

Silverman, Louis H.: *See*—
Clark, David C.; Silverman, Louis H.; and Barnard, John K., 4,024,047.

Silverman, Richard S.: *See—*
Pitel, Irving; Silverman, Richard S.; and Mueller, Richard J., 4,023,704.

Silvon, Kay, to Omark Industries, Inc. Sheet metal file guide. 4,023,445, Cl. 76-36.000.

Simidjieva, Penka Atanasova: *See—*
Burov, Atanas Tzvetanov; Simidjieva, Penka Atanasova; Stoicheva, Rumyana Toteva; and Malinovski, Jordan Petrov, 4,024,030.

Simizu, Terumasa, to Pioneer Electronic Corporation. Remote controllable automatic telephone answering apparatus. 4,024,348, Cl. 179-6.00E.

Simmons, Charles J., to Package Machinery Company. Control system for package making machine. 4,023,327, Cl. 53-51.000.

Simon, Georg Nikolaus: *See—*
Zahn, Erwin; Cordes, Claus; Simon, Georg Nikolaus; and Weiss, Hans-Peter, 4,024,115.

Simon Vacars Limited: *See—*
Mercer, Michael John; and Crispe, Stanley William, 4,023,475.

Simura, Yosimasa: *See—*
Honda, Seiichirou; Hata, Hiroyoshi; Simura, Yosimasa; and Une, Soichi, 4,024,213.

Singer, Alex. Portable compartmented lure-holding tackle box. 4,023,304, Cl. 43-54.50R.

Singer Company, The: *See—*
Arnold, Bruce Edward, 4,023,659.

Sirokorad, Jurij; and Vecera, Jiri, to Prvni Brnenska strojirna. Apparatus for digitally monitoring an analog parameter of an industrial installation. 4,024,419, Cl. 307-308.000.

Sisson, Albert E.; and Essad, Robert A., to Bendix Corporation, The. Sway control system for a tow vehicle-trailer combination. 4,023,863, Cl. 303-7.000.

Sittardt, Hans Gunter; Stotz, Siegfried; Zwanenburg, Dirk Jan; and Reijnen, Wilhelmus Adrianus Petrus, to U.S. Philips Corporation. Dispersion for applying solid particles on surfaces by an electrophotographic process. 4,024,084, Cl. 252-62.10L.

Skelly, James Kenneth; and Astbury, James Harry, to Ciba-Geigy Corporation. Production of images. 4,023,830, Cl. 282-27.500.

Skoff, Roger E., to Marvin H. Kleinberg, Inc.; Richard Morganstern Inc.; and Scholnick, Seymour A. Cornering light system for two-wheeled vehicles. 4,024,388, Cl. 240-7.550.

Slovinsky, Manuel; and Hurlock, John R., to Nalco Chemical Company. Stable water-in-oil emulsion polymers with small particle size. 4,024,097, Cl. 260-29.60N.

Smeggil, John G., to General Electric Company. Process for preparing magnetic member. 4,024,299, Cl. 427-130.000.

Smilenov, Todor Ivanov: *See—*
Enchev, Ivan Dimitrov; Ilel, Eliesser Persiado; Kunchev, Nikola Tzanov; Harizanov, Kiril Georgiev; Genevski, Vladimir Vetov; Draganov, Nedelcho Draganov; Haralampiev, Georgi Alexandrov; Smilenov, Todor Ivanov; Stoyanov, Yossif Genchev; and Alexandrov, Alexander Minchev, 4,024,035.

Smith, Don H.: *See—*
Barton, Leslie W.; and Smith, Don H., 4,023,494.

Smith, Geofrey Ian, to Landis Lund Limited. Chuck assembly. 4,023,937, Cl. 51-237.0CS.

Smith, Glen C.; and Sanders, Frederick W., to Mead Corporation, The. Production of polysulfide with PTFE coated catalyst. 4,024,229, Cl. 423-562.000.

Smith International, Inc.: *See—*
Perkin, Gregg S.; Robinson, Glen; and Thometz, Theodore G., 4,023,530.

Smith Kline & French Laboratories Limited: *See—*
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,024,260.
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,024,271.

Smith & Nephew (Australia) Pty. Limited: *See—*
Gaskell, John Anthony, 4,023,559.

Smith, Richard Lawrence, to Scans Associates, Inc. Method and apparatus for timing diesel engines. 4,023,403, Cl. 73-119.00A.

Smith, Richard Stanley: *See—*
Filko, Colin; Smith, Richard Stanley; and McIntosh, Lawrie Gandier, 4,023,720.

Smith, Robert. Dazzle protection spectacle devices for nocturnal drivers of motor vehicles. 4,023,892, Cl. 351-45.000.

Smith, Robert L., to Powers, Billy G. Layered roofing shingle with dead-air space. 4,023,321, Cl. 52-553.000.

Smithers, Philip G. K. Windscreen wipers. 4,023,232, Cl. 15-250.320.

SmithKline Corporation: *See—*
Brenner, L. Martin; Petta, John M.; and Ross, Stephen T., 4,024,273.
Colella, Donald F.; and Kaiser, Carl, 4,024,281.

Smock, George E.; Brock, Gregory C., Jr.; Hill, Homer G.; and Austin, Kenneth L., to Owens-Corning Fiberglas Corporation. Method of finishing the surface of a porous body. 4,024,304, Cl. 427-316.000.

Snam Progetti S.p.A.: *See—*
Deil'Amico, Daniela Belli; and Calderazzo, Fausto, 4,024,228.

Snowdon, Albert C.; and Dennison, William G., to Cutler-Hammer, Inc. Electrical terminal. 4,023,885, Cl. 339-278.00R.

Societa' Farmaceutici Italia S.p.A.: *See—*
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and di Marco, Aurelio, 4,024,224.

Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Cairati, Luciano; Trifiro', Ferruccio; and Villa, Pierluigi, 4,024,074.

Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
Biraghi, Giorgio; and Manghi, Carlo Alberto, 4,024,360.
De Marco, Franco; and Rigo, Gualtiero, 4,024,359.

S.A. des Anciens Etablissements Paul Wurth: *See—*
Eifer, Gerd, 4,023,782.
Legille, Edouard; and Mahr, Rene N., 4,023,832.

Societe Anonyme Dite: Antar Petroles de l'Atlantique: *See—*
Ouvrard, Paul, 4,023,397.

Societe Anonyme dite: L'Oreal: *See—*
Bugaut, Andree; and Laudon, Monique, 4,023,926.

Societe Anonyme dite: TIM-FLECK S.A.: *See—*
Fleck, Rene, 4,023,505.

Societe de Propulsion-S.E.P.: *See—*
Bachler, Werner; Frank, Rudiger; Habermann, Helmut; and Brunet, Maurice, 4,023,920.

Societe Internationale d'Investissements et de Participations (Interpar): *See—*
Noyon, Gustave Maurice, 4,023,719.

Societe Metallurgique de Gerzat: *See—*
Anagnostidis, Marc, 4,023,696.

Societe Miniere et Metallurgique de Penarroya: *See—*
DeMarthe, Jean-Michel; Sonntag, Alain; and Georgeaux, Andre, 4,023,964.

Societe Nationale des Poudres et Explosifs: *See—*
Biehler, Jean-Marie J.; Lecolier, Serge L.; and Le Roy, Patrice M., 4,024,207.
Leneveu, Louis J., 4,023,996.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*
Beyler, Roland Robert Charles; Caruel, Jacques Emile Jules; Pidebois, Jacques Eloi; Quillevere, Herve Alain; and Schenher, Michel Bernard, 4,023,351.

Soffge, Friedhelm; and Schubecker, Archim, to Dr. -Ing. H.c.F. Porsche Aktiengesellschaft. Transport vehicle. 4,023,226, Cl. 14-2.400.

Sogemaric: *See—*
Joly, Michel; and Tabet, Jean-Noel, 4,023,778.

Soles, Otto H.; and Alverson, Thomas E., to Westinghouse Electric Corporation. Compressed-gas multiphase circuit-breaker installation. 4,024,365, Cl. 200-148.00R.

Soloway, Samuel B.; and Payne, George Bernson, to Shell Oil Company. 2-(2-Halo-1-(unsaturated aliphatic))-5-nitrofurans. 4,024,161, Cl. 260-346.10R.

Sommer, Richard; and Wolfrum, Gerhard, to Bayer Aktiengesellschaft. Aryl- or alkyl-sulphonyl aminosulphonylphenyl-azo-arylene-azophenyl dyestuffs. 4,024,126, Cl. 260-186.000.

Sonnenberg, Fred, to Foster Grant Co., Inc. Polymer compositions containing stilbene halide additives. 4,024,092, Cl. 260-2.5FP.

Sonnenberg, Fred Max, to Foster Grant Co., Inc. Polysulfone resins containing bibenzyl sulfone repeating units. 4,024,119, Cl. 260-79.30A.

Sonntag, Alain: *See—*
DeMarthe, Jean-Michel; Sonntag, Alain; and Georgeaux, Andre, 4,023,964.

Sony Corporation: *See—*
Ohsawa, Mitsuo, 4,024,461.
Shimada, Takashi; Saiki, Shinishi; and Kayanuma, Akio, 4,024,564.
Suzuki, Masao, 4,024,437.

Sorlie, Donald Thomas; Brandt, Henry William, Jr.; and Hitzhusen, Thomas E., to Deere & Company. Depth control and protective apparatus for tillage assembly. 4,023,510, Cl. 111-85.000.

Sourgens, Jacques; Lajotte, Dominique; and Michelon, Francois, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Centering device for a transverse filter of an echo canceller. 4,024,357, Cl. 179-170.200.

Souriau et Cie: *See—*
Migneau, Max Jacques, 4,023,881.

Southco, Inc.: *See—*
Bisbing, Robert H., 4,023,839.

Southern Saw Service, Inc.: *See—*
Pattillo, William C.; Lukat, Robert N.; and Engel, Neils N., 4,023,736.

Souza, Anthony J.; and Michel, John M., to Woodstream Corporation. Latch assembly. 4,023,840, Cl. 292-113.000.

Spaargaren, Hans, to U.S. Philips Corporation. Control device for a matrix printer. 4,024,506, Cl. 340-172.500.

Spacelabs, Inc.: *See—*
Valiquette, Donley J.; and Finger, Tom A., 4,023,564.

Sparks, Allen K., to UOP Inc. Novel polyolefin composition of matter. 4,024,324, Cl. 526-2.000.

Sparr, Anders V., Sr. Powder dispenser. 4,023,602, Cl. 141-311.00R.

Sparwald, Volker: *See—*
Doring, Christfried; Thomas, Johann; Volcker, Manfred; Sparwald, Volker; and Habersack, Walter, 4,024,034.

Speers, Daniel E., to General Optimation, Inc. Optical communication, switching and control apparatus and systems and modular electro-optical logic circuits, and applications thereof. 4,023,887, Cl. 350-96.00C.

SPEM: Societa Prodotti Elettronici Meccanici: *See—*
Tuninetti, Domenico, 4,023,870.

Speranzin, Claudio, to Officine Savio, S.p.A. Device for distributing softening liquid on the yarn during the twisting process. 4,023,337, Cl. 57-35.000.

Sperling, Irving, to Compucorp. Interface system for coupling an indeterminate number of peripheral devices to a central processing unit. 4,024,505, Cl. 340-172.500.

Sperry, Charles R., to Instapak Corporation. Foam dispensing apparatus. 4,023,733, Cl. 239-112.000.
Sperry Rand Corporation: *See—*
Albanese, Angelo P.; Palmieri, Chester A.; and Rattiner, David H., 4,024,541.
Bennett, David Alexander. 4,023,516.
McAllister, Ronald L.; and Freimuth, John H., 4,023,479.
Torok, Ernest J.; and Lo, David S., 4,024,515.
Torok, Ernest J., 4,024,516.
Spinner, Ernest Elliott; and Hounsell, Melvin Wayne, to Marion Laboratories, Inc. Color indicator apparatus for presence of oxygen. 4,023,934, Cl. 23-254.00R.
Spitzer, Nicholas: *See—*
Ryan, Paul A.; and Spitzer, Nicholas, 4,023,408.
Spragg, T. G.: *See—*
Garcia, George E., 4,023,415.
Sproul, Nolte V.; and Kark, Michael F., to Aspro, Incorporated. Method and apparatus for making hubless V-grooved pulley and product. 4,023,250, Cl. 29-159.00R.
Staats, Henry N., to General Binding Corporation. Hot melt adhesive dot binding. 4,023,829, Cl. 281-21.00R.
Staby, George L. Plant growth substrate and process for using. 4,023,308, Cl. 47-48.500.
Stackman, Robert W.; and Berardinelli, Frank M., to Celanese Corporation. Molding composition suitable for forming improved flame retardant three-dimensional shaped articles. 4,024,102, Cl. 260-40.00R.
Stadnick, Michael. Flail type tree delimbing device. 4,023,604, Cl. 144-2.00Z.
Staedtler, J. S.: *See—*
Handl, Werner, 4,023,974.
Stagg, Lucius: *See—*
Bernstein, Stanley; Lambert, Thomas W.; Griswa, Philip J.; and Stagg, Lucius, 4,024,401.
Stahl, Torvald, to ITT Industries, Inc. Pump. 4,023,918, Cl. 415-112.000.
Stam, John G., to Pfizer Inc. Process for the manufacture of alkali metal salts of 6-[2-phenyl-2-(imidoylaminoalkanoylamino)acetamido]penicillanic acids. 4,024,130, Cl. 260-239.100.
Stamicarbon B.V.: *See—*
Alfenaar, Marinus; and Jadoul, Desire J. N., 4,024,033.
Standard Oil Company: *See—*
Herring, William M.; Johnson, James P.; and Walling, Dennis B., 4,024,501.
Standard Pressed Steel Co.: *See—*
Benz, John W., Jr., 4,023,406.
Stanford, Paul E.: *See—*
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Stauber, Siegfried, to Wyler AG. Device for measuring accelerations, particularly accelerations due to gravity. 4,023,413, Cl. 73-382.00R.
Stavropoulos, William S.; and Acuff, Kenneth J., to Dow Chemical Company, The. Determination of glutamate and glutamic transaminases. 4,024,021, Cl. 195-103.50R.
Steckowich, John, Jr.: *See—*
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Stickels, Charles A.; Anderson, Anthony T.; and Janotik, Adam M., to Ford Motor Company. Heat treatment for ball bearing steel to improve resistance to rolling contact fatigue. 4,023,988, Cl. 148-12.400.
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Stoye, Dieter; Andrejewski, Werner; and Draxler, Adolf, to Chemische Werke Huls Aktiengeselischaft. Process for coating pretreated vulcanized articles of saturated or unsaturated polyolefin rubber. 4,024,317, Cl. 428-423.000.
Strait, Carl Hope. Bridge for a stringed instrument. 4,023,459, Cl. 84-309.000.
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Suzuki, Masao, to Sony Corporation. D.C. power supply circuit. 4,024,437, Cl. 361-87.000.
Svec, Paul S., to General Electric Company. Process for making an investment mold for casting and solidification of superalloys therein. 4,024,300, Cl. 427-133.000.
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Swersey, Burt L.; and Fried, Peter I. Flexure scale. 4,023,633, Cl. 177-144.000.
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Takagi, Akira; Kawahara, Sei; and Takeda, Hideo, to Fuji Photo Film Co., Ltd. Method for coating running webs having projecting splices. 4,024,302, Cl. 427-290.000.
Takahashi, Eiji: *See—*
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Takahashi, Gaiko, to Pioneer Electronic Corporation. Piezoelectric electro-acoustic transducer with non-uniform backing. 4,024,355, Cl. 179-110.00A.
Takahashi, Naoyuki; and Murakami, Nobuaki, to Mitsubishi Jukogyo Kabushiki Kaisha. Process for removing nitrogen oxide from a waste gas. 4,024,219, Cl. 423-235.000.
Takahashi, Tadao, to Director-General of the Agency of Industrial Science and Technology. Process for the selective disproportionation reaction of olefins. 4,024,201, Cl. 260-683.00D.
Takahashi, Tsunchiko, to Fuji Photo Film Co., Ltd. Method of picking out synchronizing light beam in light scanning systems. 4,024,341, Cl. 358-206.000.
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Takamizawa, Minoru; Abe, Akira; Inoue, Yoshio; and Yoshioka, Hiroshi, to Shin-Etsu Chemical Company Limited. Method of preparing an organopolysiloxane for surface coating. 4,024,306, Cl. 427-387.000.
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Takekoshi, Tohru; and Kochanowski, John E., to General Electric Company. Method for making poly-etherimides and products produced thereby. 4,024,101, Cl. 260-33.40P.
Takekoshi, Tohru, to General Electric Company. Method for making polyetherimides. 4,024,110, Cl. 260-47.0CZ.
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Tanner, Donald L. Mobile home anchor and a method for embedding same. 4,023,314, Cl. 52-23.000.
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Tassie, Douglas Pray, to General Electric Company. Liquid propellant gun (check valve and damper). 4,023,463, Cl. 89-7.000.
Tate, Sherman E. Securing means for minimum weight and volume structural supports. 4,023,596, Cl. 138-111.000.
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Taylor, Bruce W.; and Murray, Gregory J., to Tarrant Manufacturing Company. Conveyor-type, hydraulic-powered, material-spreading apparatus. 4,023,689, Cl. 214-17.00D.
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Teal, Benjiman R. Magnetically operable engine or power plant. 4,024,421, Cl. 310-24.000.
Teal, Richard Donald, to Deere & Company. Snowmobile torque converter construction and arrangement. 4,023,635, Cl. 180-5.00R.
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Torck, Bernard; Vidouta, Georges; Pariot, Peirre; and Hellin, Michel, to Institut Francais du Petrole. Oligomerization of unsaturated hydrocarbons with acid catalysts. 4,024,203, Cl. 260-683.15A.
Torke, Gernot, to Volkswagenwerk Aktiengesellschaft. Bumper arrangement for vehicles with at least one deformation tube. 4,023,652, Cl. 188-1.00C.
Torok, Ernest J.; and Lo, David S., to Sperry Rand Corporation. Magneto-inductive readout of cross-tie wall memory system using bipolar, asymmetrical, hard axis drive fields and long sense line. 4,024,515, Cl. 340-174.0TF.
Torok, Ernest J., to Sperry Rand Corporation. Magneto-inductive readout of cross-tie wall memory system using easy axis drive field and slotted sense line. 4,024,516, Cl. 340-174.0TF.
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Toth, Geza; and Toth, Istvan, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt. Benzimidazole derivatives and fungicidal composition and method. 4,024,269, Cl. 424-273.000.
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Ts'o, Paul O. P.; and Carter, William A., to Johns Hopkins University, The. Nucleic acid complexes. 4,024,222, Cl. 424-180.000.
Tsuda, Osamu: *See—*
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Co., Ltd. Transmission synchronizing mechanism. 4,023,443, Cl. 74-866.000.
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Van Auken, Richard L., to Exxon Research and Engineering Company. Game racket. 4,023,799, Cl. 273-73.00F.
VanAuken, Richard L., to Exxon Research and Engineering Company. Golf shaft and method of making same. 4,023,801, Cl. 273-80.00B.
VandenBurg, Arlow L. Watering device. 4,023,585, Cl. 137-80.000.
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van der Lely, Cornelis; and van der Lely, Ary. Rake machine. 4,023,335, Cl. 56-370.000.
van der Lely, Cornelis. Soil cultivating implements. 4,023,507, Cl. 111-6.000.
van der Meulen, Leonard. Method and apparatus for continuous production of bags from thermoplastic film. 4,023,470, Cl. 93-35.00R.
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Vargo, William R. Internally reinforced load carrying member. 4,023,683, Cl. 211-192.000.
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Versteegh, Willem Martin, to Evans Products Company. Battery separator. 4,024,323, Cl. 429-249.000.
Vested, Harry S. Film and method for forming intaglio printing plates. 4,023,971, Cl. 96-36.300.
Vetter, Ronald F.; Diebold, James P.; Sieg, George F.; Gerrish, Howard W., Jr.; Payne, Howard H.; Rhyn, Elmer J.; and Witcosky, Irvin F., to United States of America, Navy. Slurried propellant rocket motor. 4,023,354, Cl. 60-252.000.
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Vild, Joseph P.; Cleary, William I.; and Fox, Donald P., to Republic Steel Corporation. Eddy current detector for hot test pieces having coolant fluid and purge features. 4,024,470, Cl. 324-37.000.
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Walchek, Ronald J., to Concrete Pipe Machinery Company. Means for engaging, lifting and transporting concrete pipe molds. 4,023,771, Cl. 249-139.000.

Waldherr, Arthur. Means for holding eyeglasses within a scuba mask. 4,023,214, Cl. 2-444.000.

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Wallace, Henry J. Apparatus for feeding metal scrap into molten metal. 4,023,784, Cl. 266-216.000.

Wallgard, Gunnar A.; and Gustafsson, Sven-Arne, to Saab-Scania Aktiebolag. Fail-safe separation of driverless vehicles. 4,023,754, Cl. 246-63.00R.

Walling, Dennis B.: *See—*
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Wallshein, Melvin. Orthodontic spring clip. 4,023,274, Cl. 32-14.00A.

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Wang, Richard Hsu-Shien; and Irick, Gether, Jr., to Eastman Kodak Company. Polychromophoric benzotriazole ultraviolet stabilizers. 4,024,153, Cl. 260-308.00B.

Warnecke, Herbert; and Lindner, Adolf, to Tuwa-Plastik Dr. Herbert Warnecke Erzeugung von Kunststoffartikeln Gesellschaft m.b.H. Device for the protection of wounds. 4,023,569, Cl. 128-154.000.

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Warner, Terry P. Fly fishing wire and lure. 4,023,301, Cl. 43-42.250.

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Watanabe, Osamu, to Kyowa Electronic Instruments Co., Ltd. Unit type strain gauge. 4,023,402, Cl. 73-88.50R.

Watanabe, Yoshio: *See—*
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Watson, James Gabriel Oliver. Floating breakwater. 4,023,370, Cl. 61-5.000.

Wax, Richard G.: *See—*
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Weckerle, Wolfgang F.: *See—*
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Weetall, Howard H.; and Yaverbaum, Sidney, to Corning Glass Works. Detection and quantitation of viral antibodies. 4,024,235, Cl. 424-1.000.

Weigand, Hanfried; Bellmann, Bernhard; Muller-Gerbes, Henning; Sack, Wolfhard; and Theimert, Paul-Heinz. Milling tool for preparing a joint socket in the prosthetic replacement of a joint. 4,023,572, Cl. 128-305.000.

Weinberg, Norman L., to Hooker Chemicals & Plastics Corporation. Electrochemical acyloxylation of certain aromatic compounds. 4,024,032, Cl. 204-59.00R.

Weiner, Seymour L., to Barnes Engineering Company. Shock resistant encapsulated infrared detector. 4,024,397, Cl. 250-338.000.

Weiss, Hans-Peter: *See—*
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Weiss, Stefan A.; and Johnson, John H., to Monsanto Company. Method of cell culture on polyacrylonitrile surface. 4,024,020, Cl. 195-1.800.

Wellard, Terry P. B., to Texaco Trinidad, Inc. Elbow coupler. 4,023,833, Cl. 285-179.000.

Wells, Robert A.: *See—*
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Welschof, Hans-Heinrich, to Lohr & Bromkamp GmbH. Ball cage for a constant velocity universal joint. 4,023,382, Cl. 64-21.000.

Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, to Bayer Aktiengesellschaft. Antimycotic compositions containing an imidazolylacetic acid amide or salt thereof as the active agent and the use thereof in the treatment of mycoses. 4,024,270, Cl. 424-273.000.

Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See—*
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Werner, Foller, to Gestra-KSB Vertriebsgesellschaft mbH & Co. Kommanditgesellschaft Bremen. Steam trap. 4,023,730, Cl. 236-58.000.

Wessel, Hans. Massage belt. 4,023,567, Cl. 128-63.000.

West Point Industries: *See—*
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Wetteborn, Wilhelm, to Klockner-Humboldt-Deutz Aktiengesellschaft. Device for carrying out physical and/or chemical reactions between liquids and gases. 4,024,208, Cl. 261-112.000.

Wexler, Sol; and Young, Charles E., to United States of America, Energy Research and Development Administration. Method of isotope separation by chemi-ionization. 4,024,217, Cl. 423-19.000.

Whirlpool Corporation: *See—*
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White's Electronics, Inc.: *See—*
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Whitney, John T.: *See—*
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Whittaker, Gary L.; and Hess, Cheryl A., to Xerox Corporation. Variable speed liquid development electrostatographics apparatus. 4,023,900, Cl. 355-10.000.

Wickware, James L., to Cobb, N. A. Railroad switch sweeper. 4,023,286, Cl. 37-14.000.
Widdig, Arno; Kuhle, Engelbert; Thomas, Herbert; and Schulz, Hans Peter, to Bayer Aktiengesellschaft. Anthelmintic compositions and uses employing amidophenylisothioureas. 4,024,236, Cl. 424-300.000.
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Williams, Frank J., III, to General Electric Company. Aromatic dithio dianhydrides. 4,024,162, Cl. 260-346.300.
Williams, John W., to Terminal Paper Bag Co. Wrapping machines. 4,023,330, Cl. 53-378.000.
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Winters, Giorgio; Odasso, Gianfranco; Galliani, Giulio; and Lerner, Leonard J., to Gruppo Lepetit S.p.A. 2-Phenyl-pyrazolo-[1,5-a]quinoline compounds. 4,024,149, Cl. 260-288.0CF.
Winterton, Neil: *See*—
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Winzeler, James E., to Caterpillar Tractor Co. Brake with improved torque modulation. 4,023,654, Cl. 188-170.000.
Wirasinha, Leonard Gregson, to Wijesiriwardena, Don Bernard. Prevention of sand bar formation at outlets into the sea or other bodies of water. 4,023,369, Cl. 61-2.000.
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Wisecup, David R.: *See*—
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Wiser, John A. Tiltable game surface device. 4,023,806, Cl. 273-110.000.
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Witenhafer, Donald E.; Haehn, James B.; and Cohen, Louis, to B. F. Goodrich Company, The. Internally coated reaction vessel for use in olefinic polymerization. 4,024,301, Cl. 427-230.000.
Witte, Johan Frederik. Apparatus for treating finely divided materials with gaseous fluid. 4,024,288, Cl. 426-461.000.
Wittner, Rudolf; and Harle, Fritz. Cleaning devices for records and pickup styli. 4,023,677, Cl. 206-229.000.
Wojtowicz, John A., to Olin Corporation. Production of alkali metal salts of dichloroisocyanuric acid. 4,024,140, Cl. 260-248.00C.
Wolf-Gerate GmbH: *See*—
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Wolfe, Allen Robert, to General Electric Company. Printed broadband A. C. grounded microwave terminations. 4,024,478, Cl. 333-1.100.
Wolfgram, Edgar W., to Kenco Alloy & Chemical Co. Inc. Means and method for measuring levels of ionic contamination. 4,023,931, Cl. 23-230.00R.
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Wong, Lip F., to Reynolds Metals Company. Bumper construction and method of making same. 4,023,841, Cl. 293-98.000.
Wood, Kenneth E.; and Stevens, Wesley E., to Westinghouse Electric Corporation. Multibeam sidelooking sonar display system. 4,024,490, Cl. 340-3.00R.
Wood, Ralph R., to Wyle Laboratories. Safety lock device for lifts. 4,023,649, Cl. 187-8.490.
Woods, Robert L.; Reid, Karl N., Jr.; and Gunda, Rajamouli, to Oklahoma State University. Automatic control means for infinitely variable transmission. 4,023,442, Cl. 74-863.000.
Woodstream Corporation: *See*—
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Wooler, Alan Metcalf; and Allport, Dennis Charlton, to Imperial Chemical Industries Limited. Laminates. 4,024,310, Cl. 428-313.000.
Wossner, Gunter; Zweng, Josef; and Linder, Ernst, to Robert Bosch G.m.b.H. Apparatus for the detoxification of exhaust gases in internal combustion engines. 4,023,360, Cl. 60-277.000.
Wright, Carroll G.: *See*—
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Yamada, Michinobu: *See*—
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Yamada, Shiro. Artificial hair for implanting in human tissue. 4,024,315, Cl. 428-399.000.
Yamada, Tetsuo: *See*—
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Yamaguchi, Tadashi; Ono, Takayuki; Hoshi, Hiroshi; Hirakawa, Michio; and Watanabe, Isao, to Mitsui Toatsu Kagaku Kabushiki Kaisha (Mitsui Toatsu Chemicals, Incorporated). Reinforcing composition for mineral structures. 4,024,098, Cl. 260-29.6MQ.
Yamaguchi, Yoshihiro: *See*—
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Yarrow, Christopher John; and Johnson, Ronald, to Lucas Industries Limited. Rotary inverters for converting D.C. to A.C. 4,024,455, Cl. 321-29.000.

Yarwood, John C.; Dore, James E.; and Preuss, Robert K., to Swiss Aluminium Ltd. Filtering of molten metal. 4,024,056, Cl. 210-69.000.

Yarwood, John C.: *See—*
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Yazaki, Mutsunobu; Sanada, Noriaki; and Taguchi, Tetsuya, to Canon Kabushiki Kaisha. Flash synchronizing device for a camera. 4,024,550, Cl. 354-147.000.

Year-A-Round Cab Corporation: *See—*
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Ygfors, Goran. Pliers of plastic. 4,023,450, Cl. 81-418.000.

Yon, Eugene T.: *See—*
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Yoneda, Toyoaki: *See—*
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Yonemitsu, Eiichi; Togo, Shizuo; Hashimoto, Kenichiro; Yui, Tomoyuki; and Sanada, Akihiko, to Mitsubishi Gas Chemical Company, Inc. Process for alkylating the ortho-position of phenol compounds. 4,024,195, Cl. 260-621.00R.

Yoshida Kogyo Kabushiki Kaisha: *See—*
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Yoshida, Ryo; Satomi, Takeo; Mukai, Kunio; and Hirano, Masachika, to Sumitomo Chemical Company, Limited. Amide phosphorothiolate herbicides. 4,023,956, Cl. 71-87.000.

Yoshida, Shoji; Ito, Yoshizo; Sakasita, Yoshihiro; and Kobata, Tatsuhiko, to Honny Chemicals Company, Ltd. Coloring methods for aluminum and aluminum alloys. 4,024,039, Cl. 204-181.000.

Yoshigai Kikai Kinzoku Co., Ltd.: *See—*
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Yoshigai, Toshiharu, to Yoshigai Kikai Kinzoku Co., Ltd. Brake adjusting device for bicycles. 4,023,653, Cl. 188-24.000.

Yoshikuni, Yoshiaki: *See—*
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Yoshimura, Masayoshi, to Hitachi, Ltd. Transistor with base/emitter encirclement configuration. 4,024,568, Cl. 357-68.000.

Yoshioka, Hiroshi: *See—*
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Young, Robert A., to Xonics, Inc. Resonance metal atom lamp. 4,024,431, Cl. 315-248.000.

Younker, Susan Myers. Inflatable bathing tub. 4,023,220, Cl. 4-177.0CW.

Yuda, Takuo, to Nifco Inc. Plastic device for supporting cords and other elongated bodies. 4,023,758, Cl. 248-73.000.

Yui, Tomoyuki: *See—*
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Zahn, Erwin; Cordes, Claus; Simon, Georg Nikolaus; and Weiss, Hans-Peter, to BASF Aktiengesellschaft. Manufacture of polyamide film containing ester of an aliphatic alcohol. 4,024,115, Cl. 260-78.00S.

Zahnradfabrik Friedrichshafen AG: *See—*
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Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See—*
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Zakay, Aba, to Mifal Leyitzur Mamtirim Veavizarei Hashkaya Bekibbutz Dan. Flowrate control device. 4,023,595, Cl. 138-45.000.

Zakharova, Valentina Ivanovna: *See—*
Lainer, Jury Abramovich; Tagiev, Eldar Ismail Ogly; Nasyrov, Gakif Zakirovich; Zakharova, Valentina Ivanovna; Lainer, Abram Ilich, deceased; Lainer, Vera Nikolaevna, administrator; Lainer, Jury Abramovich, administrator; and Gelfand, Nina Abramovna, administrator, 4,024,087.

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Zaltzman, Arturo. Hand-loom construction. 4,023,245, Cl. 28-15.000.

Zaske, Oscar C.: *See—*
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Zeleny, Klaus P., to Sulzer Brothers Limited. Opto-electronic weft yarn detector. 4,023,599, Cl. 139-370.200.

Zeller, Burton S.: *See—*
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Zenker, Walter, to Klockner-Humboldt-Deutz Aktiengesellschaft. Change gear transmission in group construction, especially for land vehicles and vehicles for the building industry. 4,023,418, Cl. 74-15.860.

Zevlakis, John. Dining table with a refrigerated well therein and means for using said well. 4,023,379, Cl. 62-258.000.

Ziegelheafer, Francis. Heated boot. 4,023,282, Cl. 36-2.600.

Ziegenhain, William C., to Continental Oil Company. Producing alumina having a majority of pore diameters of 35-80A. 4,024,231, Cl. 423-628.000.

Zimmer, Peter. Flat stencil for imprinting textile fabrics. 4,023,488, Cl. 101-127.100.

Zimmermann, Ulrich, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Method of separating ionized substances from an aqueous solution. 4,024,054, Cl. 210-18.000.

Zion, Alfred B., to Dominion Lock Company Ltd. Automatic multiblank key cutting device. 4,023,464, Cl. 90-13.050.

Zoecon Corporation: *See—*
Henrick, Clive A., 4,024,278.

Zollenkopf, Hans. Rotary engine. 4,023,540, Cl. 123-8.430.

Zor, Uriel; Lindner, Hans Rudolph; and Schwartz, Arie, to Yeda Research & Development Co. Ltd. Treatment of dysmenorrhea and migraine symptoms. 4,024,279, Cl. 424-319.000.

Zorner, Karl-Heinz: *See—*
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Zwanenburg, Dirk Jan: *See—*
Sittardt, Hans Gunter; Stotz, Siegfried; Zwanenburg, Dirk Jan; and Reijnen, Wilhelmus Adrianus Petrus, 4,024,084.

Zweigle, Maurice L., to Dow Chemical Company, The. Method for alkylating aminomethylacrylamide polymers. 4,024,328, Cl. 526-54.000.

Zweng, Josef: *See—*
Wossner, Gunter; Zweng, Josef; and Linder, Ernst, 4,023,360.

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AMP Incorporated: *See*—
Pritulsky, James, Re. 29,223.

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Pedain, Josef; Noll, Klaus; Konig, Klaus; and Thoma, Wilhelm, Re. 29,224.

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Paul nee Albertha B. Mitchell, Albertha M.; Moppett, Charles E.; and Brady, Thomas P., Re. 29,226.

Flournoy, Kenoth H.; Carlin, Joseph T.; and Cardenas, Ricardo L., to Texaco Inc. Surfactant oil recovery process. Re. 29,219, Cl. 166-252.000.

Freedman Artcraft Engineering Corporation: *See*—
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Hosmer, Max E., to Freedman Artcraft Engineering Corporation. Display fixture. Re. 29,222, Cl. 312-122.000.

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Moppett, Charles E.: *See*—
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Noll, Klaus: *See*—
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Pacific Scientific Company: *See*—
Yang, Elmer Chensheng, Re. 29,221.

Paul nee Albertha B. Mitchell, Albertha M.; and Moppett, Charles E., to Dow Chemical Company, The. N-substituted derivatives of 3-carboxamide and 3-thiocarboxamide. Re. 29,225, Cl. 260-248.0NS.

Paul nee Albertha B. Mitchell, Albertha M.; Moppett, Charles E.; and Brady, Thomas P., to Dow Chemical Company, The. Preparation of carboxylate and sulfonate salts of 1-cis-(3-chloro-2-propenyl)-3,5,7-triaza-1-azoniatricyclo(3.3.1.1^{3,7})decane-II. Re. 29,226, Cl. 260-248.500.

Pedain, Josef; Noll, Klaus; Konig, Klaus; and Thoma, Wilhelm, to Bayer Aktiengesellschaft. Polyurethane urea elastomers based on polycarbonate macrodiols. Re. 29,224, Cl. 260-77.5AM.

Pritulsky, James, to AMP Incorporated. Zero insertion force connector. Re. 29,223, Cl. 339-75.0MP.

Rampe, John F., to Rampe Research. Vibratory finishing machine. Re. 29,220, Cl. 51-163.100.

Rampe Research: *See*—
Rampe, John F., Re. 29,220.

Texaco Inc.: *See*—
Flournoy, Kenoth H.; Carlin, Joseph T.; and Cardenas, Ricardo L., Re. 29,219.

Thoma, Wilhelm: *See*—
Pedain, Josef; Noll, Klaus; Konig, Klaus; and Thoma, Wilhelm, Re. 29,224.

Yang, Elmer Chensheng, to Pacific Scientific Company. Acceleration sensitive motion snubber. Re. 29,221, Cl. 188-1.00B.

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Hilltop Orchards & Nurseries, Inc.: *See*—
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Wendzel, Alton C., to Hilltop Orchards & Nurseries, Inc. Redkist. 4,055, 5-17-77, Cl. 43.000.

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American Standard, Inc.: *See*—
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Ansul Company, The: *See*—
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Ashton, Harold P., to Dart Industries Inc. Knife rest or the like. 244,340, 5-17-77, Cl. D7-74.000.

Baer, Sheldon. Combined shower and lavatory module for campers, motor homes and the like. 244,374, 5-17-77, Cl. D23-49.000.

Beer, David Edwin John; and Thurston, Phillip Leslie. Artificial fishing lure. 244,373, 5-17-77, Cl. D22-27.000.

Brown, Thomas L. Automobile filter gauge. 244,361, 5-17-77, Cl. D10-64.000.

Butsch, Otto R., to Sycor, Inc. Disc-type data file. 244,387, 5-17-77, Cl. D26-5.00C.

C & M Sports Interprises, Inc.: *See*—
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Champion International Corporation: *See*—
Tellman, Stephen J.; and Selber, Oscar, 244,383.

Charlton Company, Incorporated: *See*—
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Chiu, P. W., to Durham Industries, Inc. Toy sewing machine or similar article. 244,399, 5-17-77, Cl. D34-15.00B.

Chodorow, Ingram S., to Placontrol, Inc. Dental floss holder. 244,376, 5-17-77, Cl. D28-64.000.

Colgate-Palmolive Company: *See*—
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Collica, Carl; Epifano, Leonard; and Farella, Ralph, to Medi-Ray, Inc. Waste container for radioactive material. 244,393, 5-17-77, Cl. D29-6.000.

Congleton, Wayne L., to Dolco Packaging Corporation. Packaging tray. 244,352, 5-17-77, Cl. D9-219.000.

Conners, Kenneth D. Marine engine locking bar. 244,346, 5-17-77, Cl. D8-339.000.

Conway, Ronald I.; Jones, Robert V.; and Shea, Owen P., to International Business Machines Corporation. Keyboard reader display terminal. 244,388, 5-17-77, Cl. D14-45.000.

Crescent Dental Mfg. Co. from Norland Associates: *See*—
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Crump, Richard Arthur; Gibson, John Scott; and Solar, Allan Joseph, to Northern Electric Company Limited. Telephone stand. 244,380, 5-17-77, Cl. D25-16.000.

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DeAngelis, Ann G. Detachable and adjustable urinal. 244,403, 5-17-77, Cl. D24-54.000.

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Ferguson, James S. Desk. 244,334, 5-17-77, Cl. D6-175.000.

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Friedman, Henry C.: *See—*
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Friedman, Ira, to Rowe Furniture Corporation. Chair. 244,329, 5-17-77, Cl. D6-69.000.

Frohling, Lucien O., to General Foods Corporation. Bottle. 244,349, 5-17-77, Cl. D9-63.000.

Garcia, Mike. Child's doll retaining chair. 244,324, 5-17-77, Cl. D6-7.000.

Gardiner, Thomas Morrison, to Polysar Limited. Container lid. 244,357, 5-17-77, Cl. D9-267.000.

Garvey, William J.; and Goldberg, Joel. Electronic bridge scorer. 244,395, 5-17-77, Cl. D34-13.00A.

Gaylor, Flora May. Purse or similar article. 244,404, 5-17-77, Cl. D87-3.00C.

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Frohling, Lucien O., 244,349.

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Goldberg, Joel: *See—*
Garvey, William J.; and Goldberg, Joel, 244,395.

Graham, James A. Golf stroke direction aligner. 244,397, 5-17-77, Cl. D34-5.0CB.

Graham, James A. Golf tee and direction aligner. 244,398, 5-17-77, Cl. D34-5.0CB.

Green, James R.; and Wegmann, Adolf. Loose fill material dispensing valve. 244,354, 5-17-77, Cl. D9-290.000.

Grollman, Jack D.: *See—*
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Gunder Manufacturing Company: *See—*
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Haber, Terry M. Hourglass pendant watch. 244,359, 5-17-77, Cl. D10-31.000.

Haines, Walter W., Sr. Neckwear. 244,322, 5-17-77, Cl. D2-351.000.

Hanson, Thomas E.; and McVicker, Harry J., to SCM Corporation. Toaster. 244,341, 5-17-77, Cl. D7-93.000.

Hanson, Thomas E.; and McVicker, Harry J., to SCM Corporation. Toaster. 244,342, 5-17-77, Cl. D7-93.000.

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Heumann, Jules M., to Metropolitan Furniture Manufacturing Company. Seat. 244,328, 5-17-77, Cl. D6-67.000.

Hjelle, Lars, to Colgate-Palmolive Company. Display stand for toothbrushes. 244,335, 5-17-77, Cl. D6-188.000.

Ilukowicz, Robert J., to Preco Industries, Ltd. Reinforcing rod support. 244,347, 5-17-77, Cl. D8-356.000.

International Business Machines Corporation: *See—*
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Kiester, Tommie J., to Keyline Products. Display stand. 244,333, 5-17-77, Cl. D6-85.000.

Kirkhart, Jerry W. Fish bait dispenser. 244,372, 5-17-77, Cl. D22-14.000.

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Kurtz, Ronald A.; and Manberg, Richard I., to Kulite Tungsten Corporation. Game dart shaft or similar article. 244,396, 5-17-77, Cl. D34-5.0DA.

Landesman, Eugene, to Lawson Printing Machine Co., Inc. Conveyor dryer. 244,370, 5-17-77, Cl. D15-145.000.

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Less, Stephen; Leight, Stanley; and Abbey, Peter, to Wine-a-matic Limited. Beverage vending machine. 244,402, 5-17-77, Cl. D52-3.00R.

Manberg, Richard I.: *See—*
Kurtz, Ronald A.; and Manberg, Richard I., 244,396.

Mayer, Alvin A., to Statitrol Corporation. Fire detector. 244,362, 5-17-77, Cl. D10-106.000.

Mazie, Lowell I.; Friedman, Henry C.; Getzler, Nathaniel; and Grollman, Jack D. Display box. 244,355, 5-17-77, Cl. D9-224.000.

McCord, James W. Ultrasonic generator unit housing. 244,385, 5-17-77, Cl. D13-1.000.

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Metropolitan Furniture Manufacturing Company: *See—*
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Milligan, Robert H. Soil containing medallion. 244,366, 5-17-77, Cl. D11-81.000.

Montambo, Roger Jay, to Ansul Company, The. Combined fire extinguisher and bracket. 244,392, 5-17-77, Cl. D29-2.000.

Moon, Howard, to Crescent Dental Mfg. Co. from Norland Associates. Dental amalgamator. 244,379, 5-17-77, Cl. D24-10.000.

Neal, Albert D. Clock. 244,358, 5-17-77, Cl. D10-22.000.

North American Philips Corporation: *See—*
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Pardo, John, to Procter & Gamble Company, The. Closure cap. 244,356, 5-17-77, Cl. D9-254.000.

Parsons, Don. Calf roping training aid. 244,371, 5-17-77, Cl. D19-59.000.

Phillips, Charles H. Men's shirt. 244,321, 5-17-77, Cl. D2-208.000.

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Rasmussen, Howard J., to Stewart-Warner Corporation. Timing light. 244,364, 5-17-77, Cl. D10-112.000.

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Saltz, Richard B., to Charlton Company, Incorporated. Sofa. 244,327, 5-17-77, Cl. D6-63.000.

Saltzman, George. Diamond cut in starform. 244,367, 5-17-77, Cl. D11-90.000.

Sample, Courtland J. Car mat. 244,369, 5-17-77, Cl. D12-203.000.

Samuels, Allen J.; and Lemke, Ronald D., to Thermo King Corporation. Evaporator casing of a bus air-conditioner. 244,375, 5-17-77, Cl. D23-141.000.

Schaum, David Lee; and Stram, John V., to International Business Machines Corporation. Financial services terminal. 244,386, 5-17-77, Cl. D14-45.000.

Scheid, Lloyd J. Wall panel member for mounting wall panels. 244,382, 5-17-77, Cl. D25-73.000.

Schroeder, Peter E. Curtain material. 244,400, 5-17-77, Cl. D47-6.00E.

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Stockdale, Trevor John; and Wicks, George James, to Pye Limited. Clip for holding a liquid-sample cell in a spectrophotometer. 244,391. 5-17-77, Cl. D24-29.000.
Stone, Rita M. Spool holder. 244,323, 5-17-77, Cl. D3-19.00D.
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Zimmermann, Jacques, to Les Must de Cartier-France. Design for cigar cutter. 244,390, 5-17-77, Cl. D27-51.000.

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1 LP	4,023,294
25	4,023,295
69 B	4,023,296

CLASS 43

3	4,023,297
17	4,023,298
25	4,023,299
41.2	4,023,300
42.25	4,023,301
42.74	4,023,302
53.5	4,023,303
54.5 R	4,023,304

CLASS 47

40	4,023,306
46	4,023,307
48.5	4,023,308
81	4,023,305

CLASS 49

62	4,023,309

CLASS 51

5 D	4,023,310
31	4,023,311
163.1	Re.29,220
205 R	4,023,312
209 R	4,023,313
237 CS	4,023,937

CLASS 52

23	4,023,314
79.13	4,023,315
100	4,023,316
204	4,023,317
217	4,023,326
231	4,023,318
308	4,023,319
396	4,023,324
473	4,023,320
553	4,023,321
608	4,023,322
712	4,023,323
742	4,023,325

CLASS 53

51	4,023,327
157	4,023,328
259	4,023,329
378	4,023,330

CLASS 55

30	4,023,938
73	4,023,939
163	4,023,940
169	4,023,941
241	4,023,942
304	4,023,943
481	4,023,944

CLASS 56

16.9	4,023,332
27.5	4,023,331
296	4,023,333
297	4,023,334
370	4,023,335

CLASS 57

34 R	4,023,336
35	4,023,337
52	4,023,338
53	4,023,339
75	4,023,340
81	4,023,341
156	4,023,342

CLASS 58

23 R	4,023,343
35 W	4,023,344
39.5	4,023,345
50 R	4,023,346
52 R	4,023,348
88 R	4,023,347

CLASS 60

39.5	4,023,350
39.6	4,023,349
39.74 B	4,023,351
218	4,023,352
221	4,023,353
252	4,023,354
254	4,023,355
271	4,023,356
276	4,023,357
277	4,023,358
	4,023,359
	4,023,360
302	4,023,361
347	4,023,362
385	4,023,363
421	4,023,364
614	4,023,365
671	4,023,366
693	4,023,367
698	4,023,368

CLASS 61

2	4,023,369
5	4,023,370
45 B	4,023,373
45 R	4,023,372
54	4,023,374
110	4,023,371

CLASS 62

2	4,023,375
40	4,023,946
63	4,023,376
180	4,023,947
191	4,023,948
196 B	4,023,377
256	4,023,378
258	4,023,379
279	4,023,380
309	4,023,949
381	4,023,381

CLASS 64

21	4,023,382

CLASS 65

29	4,023,950
30 R	4,023,951
32	4,023,952
86	4,023,953
112	4,023,945

CLASS 66

50 R	4,023,383
172 E	4,023,384

CLASS 68

62	4,023,385

CLASS 70

164	4,023,386
233	4,023,387
455	4,023,388

CLASS 71

15	4,023,954
64 F	4,023,955
87	4,023,956
90	4,023,957
103	4,023,958

CLASS 72

38	4,023,389
60	4,023,390
200	4,023,391
201	4,023,392
337	4,023,393
457	4,023,394

CLASS 73

2	4,023,395
12	4,023,396
17 R	4,023,397
23	4,023,398
37.7	4,023,399
54	4,023,400
81	4,023,401
88.5 R	4,023,402
119 A	4,023,403
133 R	4,023,404
134	4,023,405
139	4,023,406
146	4,023,407
170 R	4,023,408
178 H	4,023,409
229	4,023,410
349	4,023,411
362 CP	4,023,412
382 R	4,023,413
387	4,023,414
410	4,023,415
419	4,023,416
421 B	4,023,417

CLASS 74

15.86	4,023,418
30	4,023,419
52	4,023,420
57	4,023,421
70	4,023,422
96	4,023,423
217 B	4,023,424
230.17 E	4,023,425
241	4,023,426
242.1 FP	4,023,427
242.11 R	4,023,429
242.13 R	4,023,428
412 TA	4,023,430
424.8 A	4,023,431
424.8 VA	4,023,432
425	4,023,433
496	4,023,434
501 P	4,023,435
551.3	4,023,436
572	4,023,437
574	4,023,438
781 R	4,023,439
804	4,023,440
805	4,023,441
863	4,023,442
866	4,023,443
868	4,023,444
869	4,023,447

CLASS 75

1 R	4,023,959
5	4,023,960
.5 AC	4,023,961
13	4,023,962
35	4,023,963
101 R	4,023,964
170	4,023,965
226	4,023,966

CLASS 76

36	4,023,445
40	4,023,446
112	4,023,448

CLASS 81

57.16	4,023,449
418	4,023,450

CLASS 82

1.5	4,023,451

CLASS 83

161	4,023,452
174	4,023,453

CLASS 84

1.01	4,023,454
1.17	4,023,457
1.21	4,023,455
115	4,023,456
236	4,023,458
309	4,023,459
314	4,023,460
422 S	4,023,461
454	4,023,462

CLASS 89

7	4,023,463
131	4,023,465

CLASS 90

13.05	4,023,464

CLASS 91

6	4,023,466
422	4,023,467

CLASS 92

13.2	4,023,468
86.5	4,023,469

CLASS 93

35 R	4,023,470
39 R	4,023,471

CLASS 96

1 LY	4,023,967
1.3	4,023,968
1.5	4,023,969
6	4,023,970
36.3	4,023,971
101	4,023,972
115 R	4,023,973

CLASS 98

40 D	4,023,472
115 LH	4,023,473

CLASS 99

393	4,023,474
450.1	4,023,475
468	4,023,476
585	4,023,477
628	4,023,478

CLASS 100

5	4,023,479
47	4,023,480
93 P	4,023,481
215	4,023,484

CLASS 101

19	4,023,482
111	4,023,483
	4,023,485
120	4,023,486
	4,023,487
127.1	4,023,488
235	4,023,489
	4,023,490
366	4,023,491

CLASS 102

22 R	4,023,493
24 R	4,023,494
35.6	4,023,495
49.4	4,023,496
49.7	4,023,497
66	4,023,492
70.2 R	4,023,498
76 R	4,023,499

CLASS 104

138 R	4,023,500
147 R	4,023,501
173 ST	4,023,502

CLASS 105

30	4,023,503
366 B	4,023,504

CLASS 106

26	4,023,974
44	4,023,975
52	4,023,976
178	4,023,977
213	4,023,978
284	4,023,979
285	4,023,980
308 Q	4,023,981

CLASS 108

110	4,023,505

CLASS 110

8 A	4,023,508

CLASS 111

1	4,023,506
6	4,023,507
77	4,023,509
85	4,023,510
89	4,023,511

CLASS 112

242	4,023,512

CLASS 113

115	4,023,513

CLASS 114

126	4,023,516
230	4,023,517
244	4,023,518
247	4,023,519
256	4,023,514
	4,023,515

CLASS 118

8	4,023,520
16	4,023,521
47	4,023,522
49.1	4,023,523
301	4,023,524
303	4,023,525
410	4,023,526
655	4,023,527

CLASS 119

5	4,023,528
15	4,023,529
17	4,023,530
22	4,023,531
156	4,023,532
159	4,023,533

CLASS 122

479 S	4,023,537

CLASS 123

3	4,023,538
	4,023,539
8.13	4,023,534
	4,023,535
8.43	4,023,540
26	4,023,536
32 E	4,023,541
58 R	4,023,542
75 B	4,023,543
119 E	4,023,544
	4,023,545
148 DS	4,023,546
196 CP	4,023,548
196 R	4,023,547
198 D	4,023,549
	4,023,550

CLASS 124

92	4,023,551

CLASS 125

11 NT	4,023,552

CLASS 126

25 B	4,023,553
198	4,023,554

270 4,023,555
271 4,023,556
4,023,557
391 4,023,558

CLASS 127

1 4,023,982

CLASS 128

2 F 4,023,560
2 W 4,023,559
2.05 E 4,023,562
2.05 R 4,023,563
2.06 A 4,023,564
2.06 B 4,023,565
2.1 R 4,023,561
33 4,023,566
63 4,023,567
83 4,023,568
154 4,023,569
290 P 4,023,571
290 R 4,023,570
305 4,023,572
419 D 4,023,573
420 A 4,023,574
481 4,023,575

CLASS 131

10 A 4,023,576
94 4,023,577

CLASS 132

9 4,023,578
4,023,579
84 A 4,023,580

CLASS 134

11 4,023,983
38 4,023,984
167 R 4,023,581

CLASS 135

20 R 4,023,582

CLASS 137

39 4,023,583
68 R 4,023,584
80 4,023,585
82 4,023,586
88 4,023,587
103 4,023,588
363 4,023,590
533 4,023,591
565 4,023,592
625.64 4,023,593

CLASS 138

43 4,023,594
45 4,023,595
111 4,023,596
149 4,023,589
178 4,023,597

CLASS 139

59 4,023,598
370.2 4,023,599

CLASS 140

112 4,023,600

CLASS 141

207 4,023,601
311 R 4,023,602

CLASS 144

2 Z 4,023,603
4,023,604
312 4,023,605

CLASS 145

2 R 4,023,606

CLASS 148

3 4,023,985
6.14 R 4,023,986
12 D 4,023,987
12.4 4,023,988
16 4,023,989
31.55 4,023,990
120 4,023,991
132 4,023,992
172 4,023,993

CLASS 149

19.2 4,023,994
19.3 4,023,995
19.8 4,023,996

CLASS 150

1 4,023,607

CLASS 152

362 R 4,023,608

CLASS 156

85 4,024,002
148 4,024,003
169 4,024,004
172 4,024,006
180 4,024,001
212 4,024,007
272 4,024,008
4,024,009
290 4,024,010
299 4,024,011
384 4,024,005
441 4,024,012
623 Q 4,024,013
630 4,023,998
631 4,023,997
652 4,023,999

CLASS 160

343 4,023,609

CLASS 162

145 4,024,014
203 4,024,015
214 4,024,016

CLASS 164

4 4,023,610
69 4,023,611
82 4,023,612
100 4,023,613
259 4,023,614

CLASS 165

41 4,023,615
80 4,023,616
169 4,023,617
175 4,023,618

CLASS 166

6 4,023,619
217 4,023,620
252 Re.29,219

CLASS 169

68 4,023,621

CLASS 170

18 GF 4,024,352

CLASS 172

9 4,023,622
311 4,023,623
805 4,023,624
809 4,023,625

CLASS 173

8 4,023,626
12 4,023,627

CLASS 174

21 C 4,024,339

CLASS 175

56 4,023,628
285 4,023,629
297 4,023,630

CLASS 176

19 R 4,024,017
30 4,024,018
65 4,024,019

CLASS 177

46 4,023,631
70 4,023,632
144 4,023,633
211 4,023,634

CLASS 178

67 4,024,342

CLASS 179

1 A 4,024,346
1 B 4,024,345
1 G 4,024,344
2 DP 4,024,347
6 E 4,024,348
15 AA 4,024,349
15 FS 4,024,350
16 F 4,024,351
99 4,024,353
100.1 DR 4,024,354
110 A 4,024,355
170 J 4,024,356
170.2 4,024,357
170.6 4,024,358
175.2 C 4,024,361
175.3 R 4,024,359
4,024,360

CLASS 180

5 R 4,023,635
6.48 4,023,636
4,023,637
14 B 4,023,638
21 4,023,639
66 R 4,023,641
76 4,023,640
103 A 4,023,643
132 4,023,646

CLASS 181

33 HA 4,023,644
33 R 4,023,642
48 4,023,645

CLASS 182

108 4,023,647

CLASS 184

39 4,023,648

CLASS 187

8.49 4,023,649
9 R 4,023,650

CLASS 188

1 B Re.29,221
4,023,651
1 C 4,023,652
24 4,023,653
170 4,023,654
171 4,023,655
264 B 4,023,656
283 4,023,657

CLASS 191

49 4,023,658

CLASS 192

12 D 4,023,659
075 4,023,660
113 B 4,023,661

CLASS 195

1.8 4,024,020
63 4,024,000
103.5 R 4,024,021

CLASS 197

1 R 4,023,662
4,023,663
19 4,023,664
55 4,023,665

CLASS 198

449 4,023,666
474 4,023,667
504 4,023,668
573 4,023,669
604 4,023,670
728 4,023,671
735 4,023,672
4,023,673

CLASS 200

1 TK 4,024,362
83 C 4,024,363
83 S 4,024,364
148 R 4,024,365
153 G 4,024,366
308 4,024,367
314 4,024,368

CLASS 201

23 4,024,022
39 4,024,023

CLASS 202

262 4,024,024
263 4,024,025

CLASS 203

2 4,024,026
4,024,027
51 4,024,028

CLASS 204

15 4,024,029
4,024,030
46 R 4,024,031
59 R 4,024,032
4,024,033
67 4,024,034
105 R 4,024,035
129 4,024,036
149 4,024,037
159.22 4,024,040
168 4,024,038
181 4,024,039
192 C 4,024,041
195 P 4,024,042
242 4,024,044
281 4,024,045
296 4,024,043
300 EC 4,024,046
302 4,024,047

CLASS 206

219 4,023,675
229 4,023,677
363 4,023,678
504 4,023,679
507 4,023,680
562 4,023,674

CLASS 208

48 AA 4,024,048
4,024,049
4,024,050
139 4,024,052
348 4,024,051

CLASS 209

73 4,024,053
4,024,058

CLASS 210

18 4,024,054
45 4,024,055
69 4,024,056
71 4,024,057
195 R 4,024,059
197 4,024,060
198 C 4,024,061
219 4,024,062
242 R 4,024,063
258 4,024,064
315 4,024,065
330 4,024,066

CLASS 211

74 4,023,681
184 4,023,682
192 4,023,683
193 4,023,684

CLASS 214

1 H 4,023,686
1 QG 4,023,685
16.4 R 4,023,687
17 C 4,023,688
17 D 4,023,689
146.5 4,023,690
152 4,023,691
304 4,023,692
354 4,023,693
396 4,023,694
674 4,023,695

CLASS 219

76 4,024,369
90 4,024,370
110 4,024,371
121 EM 4,024,372
121 P 4,024,373
130 4,024,374
225 4,024,375
272 4,024,376
439 4,024,377
486 4,024,378

CLASS 220

3 4,023,696
3.4 4,023,697
3.8 4,023,699
7 4,023,698
63 R 4,023,700
64 4,023,701
94 R 4,023,702
268 4,023,703

CLASS 221

75 4,023,704
186 4,023,705

CLASS 222

1 4,023,706
4,023,707
20 4,023,708
70 4,023,709
148 4,023,710
174 4,023,711
175 4,023,712
193 4,023,713
196.1 4,023,714
307 4,023,715
309 4,023,716
386.5 4,023,717
399 4,023,718
505 4,023,719

CLASS 223

40 4,023,720
96 4,023,721

CLASS 225

97 4,023,723

CLASS 227

25 4,023,722

CLASS 228

20 4,023,724
123 4,023,725
184 4,023,726

CLASS 229

69 4,023,727

CLASS 232

4 R 4,023,728

CLASS 235

52 4,023,729
61.7 B 4,024,379
61.9 A 4,024,380
92 PK 4,024,381
150.26 4,024,382
150.27 4,024,383
151.32 4,024,384
152 4,024,385
153 AM 4,024,386

CLASS 236

58 4,023,730
93 R 4,023,731

CLASS 238

338 4,023,732

CLASS 239

112 4,023,733

CLASS 240

7.1 LJ 4,024,387
7.55 4,024,388

CLASS 241

17 4,023,734
22 4,023,735
82.5 4,023,736
261.3 4,023,737
271 4,023,738
296 4,023,739

CLASS 242

7.17 4,023,740
18 DD 4,023,742
18 R 4,023,741
35.5 A 4,023,743
54 R 4,023,744
55.19 A 4,023,745
107.7 4,023,746
130 4,023,747
192 4,023,748

CLASS 244

3.22 4,023,749
16 4,023,750
23 C 4,023,751
169 4,023,752

CLASS 246

5 4,023,753
63 R 4,023,754

CLASS 248

19 4,023,755
59 4,023,756
70 4,023,757
73 4,023,758
174 4,023,759
188.2 4,023,760
313 4,023,761
359 4,023,762
452 4,023,763

CLASS 249

27 4,023,764
29 4,023,765
48 4,023,766
52 4,023,767
64 4,023,769
81 4,023,768
107 4,023,770
139 4,023,771

CLASS 250

213 R 4,024,389
213 VT 4,024,390
4,024,391
216 4,024,392
303 4,024,393
308 4,024,394
328 4,024,395
338 4,024,396
4,024,397
363 S 4,024,398
423 P 4,024,399
432 R 4,024,400
439 R 4,024,401
442 4,024,402
445 R 4,024,403
462 4,024,404
516 4,024,405
518 4,024,406
574 4,024,407

CLASS 251

5 4,023,772
148 4,023,773
205 4,023,774

CLASS 252

51.5 R 4,024,083
62.1 L 4,024,084
62.9 4,024,081
136 4,024,085
162 4,024,086
179 4,024,087
301.1 R 4,024,068
301.23 4,024,071
301.4 R 4,024,069
4,024,070
316 4,024,073
358 4,024,072
422 4,024,076
442 4,024,077
454 4,024,080
455 R 4,024,079
466 J 4,024,075
470 4,024,074
551 4,024,078

CLASS 254

190 R 4,023,775

CLASS 259

2 4,023,776
3 4,023,777
4 R 4,023,778
102 4,023,780
165 4,023,779

CLASS 260

2.5 A 4,024,088
2.5 AH 4,024,090
2.5 FP 4,024,092
2.5 L 4,024,089
2.5 S 4,024,091
17.4 SG 4,024,093
19 N 4,024,094
23.7 A 4,024,095
29.3 4,024,096
29.6 H 4,024,099
29.6 MQ 4,024,098
29.6 N 4,024,097
30.4 N 4,024,100
33.4 P 4,024,101
40 R 4,024,102
45.7 P 4,024,103
45.8 R 4,024,104
45.85 R 4,024,105
45.95 F 4,024,106
47 CP 4,024,108
47 CZ 4,024,110
47 EN 4,024,109
47 ET 4,024,107
75 N 4,024,112
75 T 4,024,111
77.5 AM Re.29,224
4,024,113
78 L 4,024,116
78 R 4,024,114
78 S 4,024,115
78.3 R 4,024,117
79.1 4,024,118
79.3 A 4,024,119
112 G 4,024,120
112.5 LH 4,024,121
141 4,024,122
146 D 4,024,123
157 4,024,124
4,024,125
186 4,024,126
239 BB 4,024,128
239 D 4,024,127
239.1 4,024,129
4,024,130
239.55 R 4,024,131
240 G 4,024,132
243 C 4,024,133
4,024,134
4,024,135
4,024,137
4,024,249
243 R 4,024,136
4,024,138
244 R 4,024,139
248 C 4,024,140
248 NS Re.29,225
248.5 Re.29,226
249.8 4,024,141
250 C 4,024,082
250 Q 4,024,142
251 A 4,024,144
251 R 4,024,143
256.4 N 4,024,145
260 4,024,146
279 QA 4,024,148
288 CF 4,024,149
293.69 4,024,147
294.9 4,024,150
295 AM 4,024,151
306.5 4,024,152
308 B 4,024,153
314.5 4,024,154
326.16 4,024,155
332.3 R 4,024,156
335 4,024,157
340.3 4,024,158
340.7 4,024,159
345.2 4,024,160
346.1 R 4,024,161
346.3 4,024,162
347.4 4,024,163
347.5 4,024,164
348.5 L 4,024,165
397.3 4,024,166
410 4,024,167
412.2 4,024,168
429.5 4,024,169
438.5 R 4,024,170

449.6 M 4,024,171
468 D 4,024,172
4,024,174
468 J 4,024,175
468 K 4,024,173
470 4,024,176
472 4,024,177
4,024,178
473 A 4,024,179
502 A 4,024,180
514 D 4,024,181
521 R 4,024,182
553 A 4,024,183
561 R 4,024,184
563 R 4,024,185
566 AE 4,024,186
580 4,024,187
585 A 4,024,189
586 F 4,024,188
590 D 4,024,067
601 R 4,024,190
609 D 4,024,191
611 R 4,024,192
618 D 4,024,193
619 A 4,024,194
621 H 4,024,196
621 R 4,024,195
635 E 4,024,197
650 R 4,024,198
668 A 4,024,199
671 R 4,024,200
683 D 4,024,201
683.15 A 4,024,203
683.15 D 4,024,202
857 PE 4,024,204
857 PG 4,024,205
865 4,024,206
932 4,024,207

CLASS 261

112 4,024,208

CLASS 264

.5 4,024,209
11 4,024,210
16 4,024,211
44 4,024,212
154 4,024,213

CLASS 266

44 4,023,781
186 4,023,782
208 4,023,783
216 4,023,784
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	351	244,322	D7—	5	244,337			244,351	D11—	81	244,366		141	244,375	D29—	2	244,392
D3—	19 D	244,323		23	244,338		219	244,352		90	244,367	D24—	8	244,377		6	244,393
D6—	7	244,324		65	244,339		222	244,353		140	244,368			244,378	D34—	5 CB	244,397
		244,325		74	244,340		224	244,355	D12—	116	244,365		10	244,379			244,398
	11	244,326		93	244,341		254	244,356		203	244,369		29	244,391		5 DA	244,396
	63	244,327			244,342		267	244,357	D13—	1	244,385		54	244,403		5 SS	244,394
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4,023,356	4,023,716	4,024,378	4,024,480	4,023,372	4,024,501
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4,023,596	4,023,729	4,024,383	4,024,573	4,023,405	4,024,525
4,023,749	4,023,744	4,024,388	01 : 4,023,994	4,023,439	4,024,575
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4,024,170	4,023,755	4,024,396	10 : 4,024,193	4,023,460	4,023,435
4 : 4,023,212	4,023,757	4,024,426	4,024,197	4,023,461	4,023,506
4,023,621	4,023,760	4,024,428	11 : 4,023,862	4,023,462	4,023,511
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4,023,220	4,023,855	4,024,517	4,023,560	4,023,654	4,024,065
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PLANT PATENTS

26	:	4,055									

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE

Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE

C. Marshall Dann, Commissioner